



Dominion[®]

**Application,
Appendix, DEQ
Supplement, Direct
Testimony and
Exhibits of
Virginia Electric and
Power Company**

**Before the State Corporation
Commission of Virginia**

**Haymarket 230 kV Double Circuit
Transmission Line and 230-34.5 kV
Haymarket Substation**

Application No. 272

Case No. PUE-2015-00107

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Volume 2 of 2

Haymarket Substation and 230 kV Transmission Line Project

Environmental Routing Study

Prepared by



an ERM Group company

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Executive Summary

As described in this Routing Study, Natural Resource Group, LLC (NRG), on behalf of Virginia Electric and Power Company (Dominion), conducted a routing analysis and identified and mapped existing land use, environmental, visual, and cultural features within an established project area. A proposed route and alternative routes were then identified based on a comparison of advantages and disadvantages of each route. The process considered both the sensitivity and extent of the constraints affected relative to each route. Eight route alternatives (New Road Alternative, Northern Alternative, Railroad Alternative, Carver Road Alternative, Madison Alternative, Wheeler Alternative, I-66 Overhead Alternative, and I-66 Hybrid Alternative Routes) were identified for the Haymarket Substation and 230 kV Transmission Line Project. During analysis of these alternatives, three routes (New Road Alternative, Wheeler Alternative and Northern Alternative Routes) were determined to have technical nuances affecting their electrical viability, greater construction obstacles, permitting uncertainty, and environmental impacts and were therefore removed from further consideration.

The I-66 Alternative Routes are more favorable than the Carver Road Alternative and Madison Alternative Routes based on their shorter length, greater extent of collocation, minimized impacts on cultural resources, fewer impacts on private lands, and significantly less impacts on forests and wetlands. Prince William County has indicated support for the I-66 Hybrid Alternative Route; however, the significantly higher cost and longer construction schedule associated with the construction of the I-66 Hybrid Alternative Route burden that route. For these reasons, the I-66 Overhead Alternative Route was identified as the Proposed Route, and the remaining Alternative Routes were identified as Alternative Routes.

Haymarket Substation and 230 kV Transmission Line Project Environmental Routing Study

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1.0 INTRODUCTION AND BACKGROUND

This report presents the results of an environmental constraint identification and routing study prepared by Natural Resource Group, LLC (NRG) on behalf of Virginia Electric and Power Company (Dominion) for the proposed Haymarket Substation and 230 kV Transmission Line Project in northern Virginia. For this project, Dominion plans to convert its existing 115 kilovolt (kV) Gainesville-Loudoun Line #124, located in Prince William and Loudoun Counties, to 230 kV operation; and to construct and operate in Prince William County, Virginia and the Town of Haymarket, Virginia approximately 5.0 miles of new, double circuit 230 kV electric transmission line from a tap point approximately 0.5 mile north of Dominion's existing Gainesville Substation on the converted Line #124 ("Haymarket Junction") to a new proposed 230-34.5 kV Haymarket Substation ("Haymarket Loop") in Prince William County (Figures 1 through 3) (collectively the Project). Following initial investigation of potential route opportunities and evaluation of electrical solutions, Dominion also considered construction of a new double circuit 230 kV transmission line from the existing New Road Substation to the proposed Haymarket Substation, from the existing New Road Substation to the Wheeler Switching Station (Wheeler Station) proposed in Case No. PUE-2014-00025 pending before the State Corporation Commission of Virginia, and from the proposed Wheeler Station in Case No. PUE-2014-00025 to the proposed Haymarket Substation.

The purpose of the Project is to provide service requested by a retail electric service customer to a data center campus on 44 acres in Prince William County located west of the Town of Haymarket, to maintain reliable service for the overall growth in the area, and to comply with mandatory North American Electric Reliability Corporation (NERC) Reliability Standards. The transmission line will consist of single pole, standard galvanized structures spaced approximately 550 to 700 feet apart. On average, the poles will measure about 110 feet in height.

NRG's scope of work for this study consisted of:

1. defining and describing a study area for the project based on Dominion's transmission and service needs;
2. identifying and mapping routing constraints and opportunities within the study area;
3. identifying buildable alternative routes, each of which meets the objective of the Project as well as siting criteria identified in the Code of Virginia (Virginia Code or Va. Code) and included in the Virginia State Corporation Commission's (SCC) minimum filing guidelines for transmission projects;
4. comparing the alternative routes based on an analysis of impacts on environmental constraints and utilization of routing opportunities; and
5. recommending a proposed and alternative route(s).

Once the study area was defined, NRG identified and mapped existing land use, environmental, visual, and cultural features within this area. Sensitive environmental, political, or constructability-related features were defined as routing constraints. NRG also identified existing electric transmission and distribution lines, pipelines, railroad, and other existing rights-of-way within the study area. These features were defined as routing opportunities. NRG then layered the routing opportunities over the constraints in a geographic information system (GIS) to identify preliminary routes based on the project description provided above. Subsequently, a

more sophisticated route selection process was completed. NRG refined the preliminary routes taking into account potential impacts on environmental constraints and utilization of routing opportunities. To the extent practicable, NRG identified routes that both avoid constraints and utilize routing opportunities where appropriate.

After the potential routes were identified, NRG conducted an analysis using GIS to quantify potential impacts associated with constraints and the use of opportunities for each alternative. Crossings of sensitive features were measured and tabulated to facilitate route comparisons. Other factors such as visual and construction-related impacts were assessed based on NRG's experience in electric transmission route selection. A proposed route and alternative routes were then identified based on a comparison of advantages and disadvantages of each route. The process considered both the sensitivity and extent of the constraints affected relative to each route.

Following a preliminary quantitative assessment of route alternatives, Dominion engaged the public, including elected officials, in discussions to gather feedback on the various routes. This feedback resulted in adjustments being made to optimize the potential routes. In some cases, the original route, as well as the optimized 'variation' to that route, were both retained as buildable options for the Project.

2.0 PROJECT DESCRIPTION

As a first step in identifying potential transmission line routes, NRG (as directed by Dominion) defined a geographic study area for the Project based on Dominion's transmission and service needs as described above. Generally, the study area was defined to encompass the fixed beginning and ending points for the proposed facilities (i.e., the existing and proposed substations) as well as an area broad enough to allow for the identification of reasonable alternatives that each meets the objective of the Project. Additionally, and to the extent practicable, the limits of the study area were defined by reference to easily distinguished features, such as roads or other linear features.

After developing the study area, NRG identified multiple preliminary route alternatives that could meet the Project objectives. Subsequent to identification of those preliminary routes, NRG conducted several site visits and began evaluating the routes. Dominion also began stakeholder outreach during this time and the route evaluation and outreach efforts resulted in several changes to the preliminary routes (e.g., a route alternative along the southern edge of I-66 was changed to an alternative along the northern edge of the interstate). The result was eight route alternatives that had the potential to meet the Project objectives. These eight routes, described below, required more detailed evaluation to determine to what degree each of the routes could impact various sensitive resources and other constraints within the study area. Section 3 below describes the various resources that occur along each of the alternatives and Section 4 discusses how the alternatives could impact those resources.

2.1 Route Alternatives

2.1.1 Carver Road Alternative Route (Gainesville-Haymarket)

The Carver Road Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for 6.7 miles, terminating at the proposed Haymarket Substation. The Carver Road

Alternative Route was developed to provide an opportunity to partially collocate with existing infrastructure (Norfolk Southern Railroad and I-66), and also to avoid crossing through the residential areas located north of Carver Road and avoid crossing between the subdivisions of Greenhill Crossing and Somerset Crossing. From the tie-in location the route travels northwest for about 0.3 mile, crossing I-66, before heading in a westerly direction for another 1.7 miles paralleling the north side of I-66. This segment of the route crosses multiple on/off ramps of the interstate, Lee Highway, and University Boulevard. The route then heads southwest for about 0.5 mile crossing I-66 and generally paralleling the north side of Lee Highway. After crossing Daves Store Lane the route follows the northern side of Daves Store Lane for 0.2 mile and then crosses Daves Store Lane a second time.

The route then continues northwest for 0.2 mile crossing Daves Store Lane and John Marshall Highway (SR 55). From here, the route heads southwest for about 0.2 mile before heading northwest along the Norfolk Southern Railroad tracks for about 0.1 mile. The route then crosses the tracks and continues in a southwest direction for about 0.7 mile crossing Yountville Drive and Somerset Crossing Drive. The route then travels southwest for about 0.3 mile, crossing Carver Road and then heading in a general northwest direction for 0.5 for mile before crossing Old Carolina Road. From here, the route generally continues northwest for 0.6 mile passing through forested areas surrounding residences and crossing Haymarket Drive. The route then heads northeast for 0.2 mile before turning west for another 0.2 mile. The route then follows the eastern side of James Madison Highway (U.S. 15) for 0.1 mile, crosses James Madison Highway (U.S. 15), and heads southwest for approximately 0.3 mile before heading northeast for about 0.2 mile and terminates into the proposed Haymarket Substation.

2.1.2 I-66 Hybrid Alternative Route (Gainesville-Haymarket)

The I-66 Hybrid Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for about 5.3 miles, terminating at the proposed Haymarket Substation. In addition to providing an opportunity to maximize collocation, the I-66 Hybrid Alternative Route was developed not only to avoid the potential for visual resource impacts after construction but to minimize the number of residences located along the corridor that would be affected by an overhead option. In addition, residents and elected officials requested that an underground route be evaluated in the routing study. The hybrid route would utilize both overhead and underground transmission facilities. From the tie-in location, the route follows the same path as the Carver Road Alternative Route for 2.2 miles until it reaches the transition station, where an overhead to underground transition would occur. The transition station is proposed to be located on the west side of the intersection of I-66 and Lee Highway (U.S. 29). At this point the I-66 Hybrid Alternative Route (underground segment) heads northwest and continues along the southern side of I-66 for 0.7 mile crossing Catharpin Road (SR 676). After crossing Catharpin Road (SR 676), the route continues northwest, crossing I-66, for approximately 1.2 miles following the northern side of I-66. The route then crosses I-66 and then follows the southern side of I-66 and associated eastbound on-ramp for about 0.4 mile. After crossing James Madison Highway (U.S. 15) the route follows the western side of the highway for about 0.1 mile, crosses John Marshall Highway (SR 55), and then continues northwest on the south side of John Marshall Highway for approximately 0.4 mile before heading south and terminating at the proposed Haymarket Substation.

2.1.3 I-66 Overhead Alternative Route (Gainesville-Haymarket)

The I-66 Overhead Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for about 5.0 miles, terminating at the proposed Haymarket Substation. The I-66 Alternative Route was developed to provide an opportunity to maximize collocation with existing infrastructure (I-66 and Norfolk Southern Railroad) and provide the shortest and most direct route to the proposed substation location. From the tie-in location, the route follows the same path as the Carver Road Alternative Route for about 2.1 miles until it crosses Lee Highway (U.S. 29) and various I-66 on/off ramps. At this point the route deviates from the Carver Road Alternative Route and heads southwest for 0.1 mile before heading northwest 1.9 miles following the northern side of I-66 and crossing Catharpin Road (SR 676). The route then crosses I-66 and heads in a southwest direction for 0.3 mile crossing James Madison Highway (U.S. 15). The I-66 Overhead Alternative Route then meets up with the I-66 Hybrid Alternative Route on the west side of the James Madison Highway (U.S. 15) and follows this route alignment for the remaining 0.6 mile before terminating at the proposed Haymarket Substation.

2.1.4 Madison Alternative Route (Gainesville-Haymarket)

The Madison Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for 8.2 miles, terminating at the proposed Haymarket Substation. The Madison Alternative Route was developed to provide an opportunity to partially collocate with the Norfolk Southern Railroad, avoid crossing near residences along the Carver Road Alternative Route, and bypass a portion of property proposed for the Somerset Crossing Extension. From the tie-in location, the route follows the same path as the Carver Road Alternative Route for 4.7 miles to a point on the south side of Carver Road before crossing Old Carolina Road. At this point, the Carver Road Alternative Route heads northwest to follow Carver Road, while the Madison Alternative Route deviates from the Carver Road Alternative Route and heads southwest for about 1.6 miles. This segment of the route crosses Old Carolina Road and Thoroughfare Road. The route then crosses James Madison Highway (U.S. 15) and continues northeast for 0.7 mile following the west side of the highway and crossing Thoroughfare Road, Hokie Place, and Market Ridge Boulevard. Continuing northeast the route then crosses James Madison Highway (U.S. 15) and follows the eastern side of the highway for about 0.5 mile before meeting back with the Carver Road Alternative Route just south of North Fork Broad Run. The route then follows the same path as the Carver Road Alternative Route for the remaining 0.6 mile and terminates at the proposed Haymarket Substation.

2.1.5 New Road Alternative Route (New Road-Haymarket-Wheeler)

The New Road Alternative Route would consist of a new double circuit 230 kV transmission line that extends from the New Road Substation 12.6 miles to the proposed Haymarket Substation, and a new single circuit 230 kV transmission line that extends 8.6 miles from the Wheeler Station to the proposed Haymarket Substation. The New Road Alternative Route was developed to provide an alternative to the tie-in location along Gainesville-Loudoun Line #124. Although much longer than the more direct Gainesville to Haymarket route alternatives, the New Road Alternative Route would avoid several subdivisions in and near Haymarket and the congested area around the I-66 right-of-way. The two segments include about 1.5 miles of

overlap where it is anticipated that two lines would need to be built from a point just west of Thoroughfare Road east into the proposed Haymarket Substation.

For the first portion of the route, from the existing New Road Substation, the route heads southeast for about 1.0 mile along an existing 115 kV transmission line and roughly following the Loudoun County and Prince William County border, crossing in and out of the counties. The route then heads southwest and west for about 4.0 miles through Prince William County crossing Logmill Road, Shelter Lane, and Sudley Road. The route then continues southwest crossing James Madison Highway (U.S. 15) and following the northern side of Waterfall Road for about 1.0 mile and crossing Mill Creek Road. After crossing Waterfall Road, the route then continues southwest along the southern side of Waterfall Road for approximately 1.6 miles crossing Dogwood Tree Court and Mountain View Lane. The route then continues southwest for another 0.3 mile, crossing Little Bull Run, before heading southeast for 1.5 miles following the eastern side of Antioch Road. The route then crosses Antioch Road and heads southwest for about 1.0 mile following the eastern side of Thoroughfare Road. From this point, the route heads south for 0.3 mile crossing I-66, John Marshall Highway (SR 55), and the Norfolk Southern Railroad. After crossing the railroad, the route heads southeast for 0.4 mile crossing Thoroughfare Road and making a second crossing of the railroad. The route then heads northeast for 0.2 mile, crossing the North Fork of Broad Run, before heading east for 0.8 mile following the southern side of John Marshall Highway (SR 55). The route then crosses Charles Street and turns south into the proposed Haymarket Substation.

For the second portion of the route, from the Wheeler Station proposed in Case No. PUE-2014-00025, the route travels north for 0.1 mile before heading in a westerly direction for about 1.4 miles crossing Buckland Mill Road and entering Fauquier County and crossing Acorn Farm Lane and South Run. The route then crosses Vint Hill Road (VA 215) and continues northwest for about 1.4 miles crossing VA-6 and Lee Highway (U.S. 29). After crossing Lee Highway (U.S. 29) the route crosses through a rural residential area along Broad Run and crosses back into Prince William County. The route then heads in a northerly direction for about 2.3 miles crossing Broad Run and continuing north towards John Marshall Highway (SR 55). The route then continues east for 0.3 mile following the south side of John Marshall Highway (SR 55). The route then heads southeast following the southern side the Norfolk Southern Railroad for about 0.3 mile, crosses Thoroughfare Road, and then crosses the railroad. After crossing the railroad, the route follows the northern side of the railroad for 0.2 mile. The route then heads northeast for 0.2 mile before heading east and following the southern side of the John Marshall Highway (SR 55) for 0.8 mile. After crossing Charles Street, the route turns south into the proposed Haymarket Substation.

2.1.6 Northern Alternative Route (Gainesville-Haymarket)

The Northern Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for 6.1 miles, terminating at the proposed Haymarket Substation. The Northern Alternative was developed to identify a potential route utilizing open space to the north of I-66 as well as avoid and minimize impacts on residential subdivisions south of I-66. From the tie-in location, the route follows the Carver Road Alternative for the first 1.4 miles to a point west of the University Boulevard crossing. From here the route deviates northwest for 0.2 mile crossing Lee Highway (U.S. 29). After crossing Lee Highway (U.S. 29), the route continues northwest through the forested area of Conway-Robinson Memorial State Forest for approximately 0.6 mile. The route then pivots 0.1 mile northeast and then 0.2 mile north through the forest to

avoid the residential areas located on the west side of the route. From here, the route generally continues west/northwest (following and crossing Little Bull Run) for approximately 2.4 miles and crosses Heritage Hunt Drive, Catharpin Road, and Old Carolina Road. The route then heads south following the eastern side of James Madison Highway (U.S. 15), crosses the intersection of James Madison Highway (U.S. 15) and Heathcote Boulevard, and continues to follow the James Madison Highway (U.S. 15) on the western side for 0.3 mile. The route then heads northwest for 0.6 mile following the northern side of I-66 before crossing I-66. After crossing I-66, the route heads south for 0.2 mile and terminates into the proposed Haymarket Substation.

2.1.7 Railroad Alternative Route (Gainesville-Haymarket)

The Railroad Alternative Route would consist of a new 230 kV double circuit transmission line from the Haymarket Junction to the proposed Haymarket Substation, which originates at the proposed tie-in location on the converted 230 kV Line #124 near the end of Cushing Road and extends for 5.7 miles, terminating at the proposed Haymarket Substation. The Railroad Alternative Route was developed to identify a potential route utilizing open space as well as avoid the I-66 right-of-way and to provide an opportunity to maximize collocation with the existing infrastructure (Norfolk Southern Railroad). From the tie-in location, the route follows the Carver Road Alternative Route for the first 3.5 miles to a point west of the John Marshall Highway (SR 55) and Norfolk Southern Railroad crossings. The route then follows the southern side of the railroad and the northern side of North Fork Broad Run for 1.0 mile. This segment of the route passes through the Town of Haymarket. After crossing Jefferson Street (ST 625) the route crosses North Fork Broad Run and continues on the south side of the stream for 0.3 mile before the route meets up with the Carver Road Alternative Route and follows it for the remaining 0.8 mile into the proposed Haymarket Substation.

2.1.8 Wheeler Alternative Route (Wheeler-Haymarket)

The Wheeler Alternative Route would consist of a new 230 kV double circuit transmission line that extends for 8.6 miles from the proposed Wheeler Station (Case No. PUE-2014-00025) to the proposed Haymarket Substation. Additional electrical configurations, depending on the outcome of the Warrenton-Wheeler-Gainesville project before the SCC in Case No. PUE-2014-00025 are required to complete a Wheeler to Haymarket solution. Similar to the New Road Alternative Route, the Wheeler Alternative Route was developed to provide an alternative to the tie-in location along Gainesville-Loudoun Line #124. Although longer than the more direct Gainesville to Haymarket route alternatives, the Wheeler Alternative Route would avoid several subdivisions in and near Haymarket and the congested area around the I-66 right-of-way. The description of the Wheeler Alternative Route is the same 8.6 mile description included in the New Road Alternative Route discussion above.

Second, the route would begin at the Wheeler Station proposed in Case No. PUE-2014-00025, depending on the outcome of the Warrenton-Wheeler-Gainesville project. If Dominion's proposed solution is built, this solution would require a new circuit for 2.1 miles along the NOVEC Line #922 to Dam Junction then install a new single circuit on the vacant arm from the Vint Hill Switching Station proposed in Case No. PUE-2014-00025. If SCC Staff's recommended solution is built, this solution would require the wreck and rebuild of Line #922 from Wheeler to Dam Junction with double circuit structures and the installation of a new single circuit from Dominion's proposed Wheeler Station to a new Vint Hill Switching Station as proposed in Case No. PUE-2014-00025.

2.2 Structure Types and Right-of-Way Widths

Dominion will use single pole structures or double pole H-frame structures for the proposed 230 kV double circuit transmission lines, depending on which alternative route is constructed. For the Carver, Madison, and I-66 Overhead Alternative Routes, Dominion proposes to use single pole structures and a 100-foot-wide right-of-way. For the Northern, New Road, and Wheeler Alternative Routes, Dominion would use single pole structures and a 100-foot-wide right-of-way. For the Railroad Alternative Route, Dominion would use single pole structures (100-foot-wide right-of-way) from the tie-in to the Norfolk Southern Railroad crossing northwest of Lee Highway (U.S. 29), then use double pole H-frame structures (120-foot-wide right-of-way) from that point to the proposed Haymarket Substation. For the I-66 Hybrid Alternative Route, Dominion would use single pole structures (100-foot-wide right-of-way) from the tie-in location until the transition station where the transmission line would be installed underground and require a 50-foot-wide right-of-way. All aboveground structures will be constructed of galvanized steel.

2.3 Construction, Operation, and Maintenance Process

Construction of new overhead transmission lines may involve some or all of the steps which are listed below:

- detailed survey of the route alignment;
- right-of-way acquisition and clearing;
- construction of access roads, where necessary;
- installation of tower foundations;
- assembly and erection of new structures;
- stringing and tensioning of the conductors; and
- final clean-up and land restoration.

All appropriate materials for the proposed 230 kV structures would be delivered and assembled at each structure location in the right-of-way. Detailed foundation design will not be completed until prior to construction; however, depending on soil conditions, could include poured concrete that requires excavation, or steel piles or caissons that might be vibrated, drilled, or driven into place. Structures would be erected with a crane and anchored to the foundation during final assembly. If there is excess soil from foundation construction, it would be evenly distributed at each structure and the soil replanted and stabilized. In wetland areas, excess soil would be removed and evenly distributed on an upland site within Dominion's right-of-way or taken off site to a disposal location. Typical construction equipment may include hole diggers or drilling equipment, cranes, wire-stringing rigs, tensioners, backhoes, and trucks.

All conductors and shield wires would be strung under tension. This system involves stringing a "lead line" between structures for the conductors and ground wires. The rope pulls a steel cable that is connected to the conductors and shield wires, which are pulled through neoprene stringing blocks to protect the conductor and shield wire from damage. Stringing the conductors and shield wires under tension protects the wires from possible damage should they be allowed to touch the ground, fences, or other objects.

Maintaining the right-of-way under the transmission lines is essential for the reliable operation of the line as well as public safety. Operation and maintenance of the line would consist of

periodic inspections of the line and the right-of-way, occasional replacement of hardware as necessary, periodic clearing of vegetation, either mechanically or by selective, low-volume application of approved herbicides of vegetation within the corridor, and the cutting of danger trees outside the right-of-way. Danger trees are trees outside the cleared corridor that are sufficiently tall to potentially impact the transmission line should the trees fall into the right-of-way. Periodic inspections would occur on a regular basis and utilize both aerial and walking patrols. Normal operation and maintenance would require only infrequent visits by Dominion or its contractors.

Most maintenance activities consist of selective, low-volume herbicide applications targeting only tree species on the right-of-way every 3 to 5 years, and the cutting of danger trees every 3 years. Dominion only uses herbicides that are approved by the U.S. Environmental Protection Agency on power line rights-of-way.

3.0 INVENTORY OF EXISTING CONDITIONS

Once NRG defined the study area, a list of routing criteria to help guide the routing process and provide a basis for comparing potential routes was developed (see Table 3-1). The routing criteria include routing constraints (i.e., sensitive environmental resources) and routing opportunities (i.e., existing corridors) as described in more detail in Section 4. NRG inventoried existing conditions, routing constraints, and routing opportunities using information obtained from publicly-available GIS databases, agency websites and databases, published documents such as county or municipal land use plans, and communication with agency and county staff, stakeholders, and elected officials. In those cases where GIS data were not available for a particular environmental resource or other feature, NRG obtained the best available hard-copy or online map and hand digitized the information needed to complete the study.

The existing conditions along each route option that were identified are discussed below. Table 3-1 identifies the categories of environmental features considered in the study. Descriptive information regarding these features is provided in subsequent sections.

3.1 Land Use Constraints

3.1.1 Land Ownership

NRG quantified information on land ownership in the Project area using publicly-available GIS databases and digital tract data obtained from the Fauquier and Prince William Counties' Office of Information Technology. These data indicate that the majority of the lands crossed by the route options are privately owned with smaller portions of federal, state, county, and municipal land, existing rights-of-way, and land for which ownership is not listed. Figure 4 in Appendix C depicts land ownership along each route option.

The Carver Road Alternative, I-66 Hybrid Alternative, and the I-66 Overhead Alternative Routes all cross portions of Prince William County dedicated road rights-of-way. The Carver Road Alternative Route crosses a small portion of parcel that has been dedicated to the county to build an extension to Somerset Crossing Drive. The I-66 Hybrid Alternative Route and the I-66 Overhead Alternative Route both cross a portion of Jordan Lane (just north of I-66) that is county dedicated. County dedicated rights-of-way are areas that are planned for roads that will ultimately fall under Virginia Department of Transportation (VDOT) responsibility, but until a road is built, remain the responsibility of the county.

The New Road Alternative Route and Wheeler Alternative Route cross less than 0.1 mile of local government land owned by the Town of Manassas associated with Lake Manassas. The Northern Alternative crosses 0.9 mile of state owned land associated with the Conway-Robinson Memorial State Forest.

TABLE 3-1	
Haymarket Substation and 230 kV Transmission Line Project Routing Constraints and Opportunities Considered in the Study Area	
Constraint Type	Description
Land use Constraints	
Land Ownership	<ul style="list-style-type: none"> Federal, state, and local government lands Private Lands
Recreational Areas	<ul style="list-style-type: none"> National, state, county, or municipal parks in the project vicinity Federal, state, county, or municipal managed recreation areas crossed Golf courses Recreation trails (biking, hiking, birding, wildlife)
Existing land use and land cover	<ul style="list-style-type: none"> Existing subdivisions Land cover types (e.g., forest, agricultural, developed) Residences, churches, schools, cemeteries
Land Use Planning and Zoning	<ul style="list-style-type: none"> Zoning Districts
Planned Developments	<ul style="list-style-type: none"> Planned or Proposed Residential, Commercial, or Industrial Developments
Conservation lands	<ul style="list-style-type: none"> Virginia Outdoors Foundation and Virginia Department of Conservation and Recreation conservation land and easements Prince William County protected open space Other conservation lands
Transportation	<ul style="list-style-type: none"> Road crossings Railroad crossings
Environmental Constraints	
Surface Waters	<ul style="list-style-type: none"> Wetlands Waterbodies
Land Cover	<ul style="list-style-type: none"> Forested Lands
Protected or Managed Areas	<ul style="list-style-type: none"> Resource Protection Areas
Protected Species	<ul style="list-style-type: none"> Stream Conservation Units Natural Heritage Resources Threatened and Endangered Species Bald Eagles
Vegetation	<ul style="list-style-type: none"> Vegetation Characteristics Virginia Department of Forestry medium and high priority forests
Visual Constraints	
Visually Sensitive Areas	<ul style="list-style-type: none"> Viewsheds to and from Visually Sensitive Areas
Cultural Resources Constraints	
Historic Properties	<ul style="list-style-type: none"> Sites Listed in or Eligible for Listing in the National Register of Historic Places
Other Cultural Resource Sites	<ul style="list-style-type: none"> Archaeological Sites Historical or Architectural Sites Prehistoric and Historic Sensitivity Areas Battlefields Virginia Department of Historic Resources Protect Easements
Geological Constraints	
Mineral Resources	<ul style="list-style-type: none"> Mines or Mining Areas
Engineering Constraints	
Length	<ul style="list-style-type: none"> Length of Routes
Existing Electric Facilities	<ul style="list-style-type: none"> Transmission or Distribution Lines
Greenfield construction	<ul style="list-style-type: none"> New Corridor (i.e., not adjacent to existing corridor)

TABLE 3-1 Haymarket Substation and 230 kV Transmisslon Line Project Routing Constraints and Opportunities Considered in the Study Area	
Constraint Type	Description
Routing Opportunities	
Land use Planning	• Designated Utility Corridors
Existing Electric Facilities	• Transmission or Distribution Lines
Other Utilitles	• Pipelines
Transportation Infrastructure	• Roads or Railroads

3.1.2 Recreation Areas

NRG identified recreation areas through review of digital data sets and maps, U.S. Geological Survey (USGS) topographic quadrangles, and recent digital aerial photography, and county websites. This review identified a variety of recreation areas either crossed or located within 0.25 mile of route options. These are described below (ordered alphabetically) and shown on Figure 5 in Appendix C.

Buckland Mills Elementary School Facilities

Buckland Mills Elementary School is a Prince William County public school located north of Carver Road and south of Somerset Crossing Drive (SR 3310). The school is accessed from Wharfdale Place. The Carver Road Alternative Route and the Madison Alternative Route are both located within 0.25 mile of the school facilities.

Conway-Robinson Memorial State Forest

The Conway-Robinson Memorial State Forest is located just north of Lee Highway (U.S. 29). The 444 acres of land became a State Forest in 1938 and the forest consists of a mixture of pine and old growth hardwood stands. The forest is a day use area only with approximately five miles of trails (hiking, biking, and horseback riding), a picnic shelter, and parking area available for use (Virginia Department of Forestry, 2014). The Northern Alternative Route crosses about 0.9 mile of the western edge of the forest. The state forest is also within 0.25 mile of the I-66 Overhead Alternative, I-66 Hybrid Alternative, Railroad Alternative, Madison Alternative, and the Carver Road Alternative Routes.

Crossroads Village Community Center

Crossroads Village is a private community located south of Heathcote Boulevard and north of I-66 along Legend Drive. The village has a community center located off of Legend Drive (SR 1737) with a swimming pool and tennis courts available for use. The I-66 Overhead Alternative and the I-66 Hybrid Alternative Routes are located within 0.25 mile of this community center.

Culpeper Loop of the Virginia Birding and Wildlife Trail

The Culpeper Loop of the Virginia Birding and Wildlife Trail is a driving trail that provides access to forested parks, reservoirs, and Civil War historic areas, and offers multiple bird viewing areas including Kelly's Ford, Rappahannock River, and Lake Pelham. The trail is located along Lee Highway (U.S. 29), I-66, and John Marshall Highway (SR 55). Birds seen along the trail include scissor-tailed flycatchers, red-tailed hawks, American kestrels, northern harriers, short-eared

owls, American woodcock, tundra swans, hooded mergansers, bald eagles, ospreys, kingbirds, horned larks, white-throated sparrows, and eastern towhees (Virginia Department of Game and Inland Fisheries [VDGIF], 2013). The trail would be crossed by all route alternatives.

Elizabeth Nickens Park Site

The Elizabeth Nickens Park site is located just south of I-66, north of John Marshall Highway (SR 55), and west of Antioch Road. This approximately 23-acre park is primarily forested with a few small areas of open space and no facilities on site. The Wheeler Alternative Route is located within 0.25 mile of this park and the New Road Alternative would cross about 170 feet of the western portion of the park.

Gainesville Elementary School

The Gainesville Elementary School is located between I-66 and Washington Street (SR 55) within the Town of Haymarket boundary. Park facilities are used by the school and are also open to public use. Facilities include three baseball/softball fields and one general use field. The I-66 Overhead and Hybrid Alternative Routes are located within 0.25 mile of this recreation area.

George G. Tyler Elementary School Facilities

George G. Tyler Elementary School is a Prince William County public school located south of I-66 and north of John Marshall Highway (SR 55). Facilities include three baseball/softball fields, a playground, basketball courts, and multi-purpose fields. The I-66 Overhead and Hybrid Alternative Routes, the Railroad Alternative Route, The Carver Road Alternative Route, and the Madison Alternative Route are all within 0.25 mile of the school facilities.

Haymarket Museum

The Haymarket Museum is located on the Washington Street (SR 55) in the Town of Haymarket. The museum is located in the old Town Hall and the exhibits include historical displays on the 18th Century, Antebellum Period, Civil War, Reconstruction, twentieth century, historic buildings, and families that contributed to the development of the town (Haymarket Museum, 2014). The I-66 Overhead and Hybrid Alternative Routes are within 0.25 mile of the museum.

Haymarket SportsPlex

The Haymarket SportsPlex is a privately-owned indoor sports arena located on James Madison Highway (U.S. 15) near the downtown of Haymarket, Virginia. It is a 24,000 square foot facility providing indoor sports arena, youth sports, and instructional academics. The Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Railroad Alternative, and Madison Alternative Routes are all located within 0.25 mile of this recreation area.

Heritage Hunt Golf and Country Club

The Heritage Hunt Golf and Country Club is an 18-hole privately-owned golf course located in Gainesville, Virginia. The golf course is located in an existing subdivision area located just north of I-66. The facility includes two clubhouses, tennis courts, two swimming pools, and two

restaurants. The Northern Alternative Route crosses approximately 0.5 mile of the golf course and country club.

Manassas National Battlefield Park

The Manassas National Battlefield Park is located north of I-66 near the eastern tie-in location site for all of the route alternatives, except the New Road and Wheeler Alternative Routes. The park, managed by the National Park Service, preserves the site of two major American Civil War battlefields: First Battle of Bull Run and the Second Battle of Bull Run. The park provides visitors the opportunity to explore historic terrain on walking and equestrian trails with historic sites along the trails. The portion of the park that is located within 0.25 mile of the Northern Alternative Route, I-66 Overhead and Hybrid Alternative Routes, Railroad Alternative Route, Madison Alternative Route, and the Carver Road Alternative Route is located north of I-66, east of Pageland Lane and south of Lee Highway (U.S. 29). This portion of the park is home to the park administrative headquarters, multiple trails, and two historic site houses.

PACE West School Facilities

PACE West School is located next to George G. Tyler Elementary School off of John Marshall Highway (SR 55). Outdoors facilities available to the public include a large multi-purpose field. The I-66 Overhead and Hybrid Alternative Routes, the Railroad Alternative Route, Madison Alternative Route, and Carver Alternative route are all within 0.25 mile of the school facilities.

Piedmont Club

The Piedmont Club is an 18-hole privately-owned golf course located in Prince William County. The golf course is located in an existing subdivision area just east of James Madison Highway (U.S. 15) and north of Heathcote Boulevard. The facility includes a driving range, fitness center, tennis courts, two swimming pools, and a restaurant. The Northern Alternative Route crosses about 0.4 mile of the Piedmont Club property through forested land south of the golf course.

Piedmont South Community Center and Facilities

Piedmont South is a private community located north of I-66 and both north and south of Heathcote Boulevard. Recreation areas are scattered through the community and include a community center with indoor facilities and outdoor pond, tennis courts, playground, and a greenway. The Northern Alternative Route and the I-66 Overhead and Hybrid Alternative Routes are located within 0.25 mile of portions of these facilities.

Red House Park

Red House Park is located south of the intersection of Red House Road (SR 1150) and Susquehanna Road (SR 1159). This is a private park located within a residential subdivision. Park facilities include a basketball court, playground, and multi-purpose field. The Railroad Alternative Route is located within 0.25 mile of this park.

Silver Lake Regional Park

Silver Lake Regional Park is a 230-acre park in Prince William County located off of Antioch Road near the intersection of Thoroughfare Road. The park was previously a privately-owned family summer campground and became a county park designated for recreational use opening

in 2009. The park includes a 23-acre lake for fishing, swimming, and non-motorized boat use, four miles of multi-purpose trails, and picnic areas. The New Road Alternative Route is within 0.25 mile of this recreation area.

Somerset Crossing Community Center

The Somerset Crossing Community Center is located off of Somerset Crossing Drive (SR 3310). The community center is a private center for residents of the Somerset Crossing community. Facilities available onsite include a swimming pool, hot tub, basketball court, and open space. The Railroad Alternative, Carver Road Alternative, and Madison Alternative Routes are all within 0.25 mile of this community center.

Vint Hill Farms Park

Vint Hill Farms Park is an approximately 12-acre park located at the intersection of VA 215 and Kennedy Road. South Run Creek flows through the park which consists of open fields and woodland. The park is a stop along the Culpeper Loop trail discussed above. The New Road Alternative and Wheeler Alternative Routes are within 0.25 mile of this recreation area.

Waterfall Park

Waterfall Park is a neighborhood park located between Jackson Mill Road and Mt. Atlas Lane in the Waterfall Village subdivision. The park is forested with walking trails available for use. The New Road Alternative Route is located within 0.25 mile of this recreation area.

Westmarket Community Center

The Westmarket Community Center is a private community center located off of Popes Creek Place near the intersection with Piedmont Vista Drive, which is associated with the Westmarket community association. The facility includes a community center, basketball court, and two tennis courts. The Northern Alternative Route is within 0.25 mile of this community center.

3.1.3 Existing Land Use and Land Cover

Land use and land cover within the Project area were identified using the Virginia Department of Forestry Land Cover Dataset data layer. Existing land use for each route alternative is depicted on Figure 6 in Appendix C and quantified in Table 4-1.

NRG identified buildings (including dwellings) within 500 feet of each route through review of various digital data sets and maps, USGS topographic quadrangles, and current aerial photography. Features found within 500 feet of project route alternatives include churches, cemeteries, and schools, as well as other public, residential, commercial, and industrial buildings.

Carver Road Alternative Route (Gainesville-Haymarket)

There is one church, one cemetery, and one school located within 500 feet of the Carver Road Alternative Route. The Gainesville United Methodist Church and cemetery are located on John Marshall Highway (SR 55) between Catharpin Road and Daves Store Lane. The church is located about 100 feet northeast of the route alternative, while the cemetery is located approximately 150 feet from the route alternative. Buckland Mills Elementary School is located

just northeast of Carver Road about 400 feet from the Carver Road Alternative Route. Buildings located within 500 feet of this route alternative are primarily residences; however, there are also some industrial and commercial buildings within 500 feet along the eastern portion of the route. As shown in Table 4-1, there are four existing subdivisions crossed by this route alternative.

I-66 Hybrid and Overhead Alternative Routes (Gainesville-Haymarket)

There is one school and no churches or cemeteries located within 500 feet of either the I-66 Overhead Alternative or the I-66 Hybrid Alternative Route. PACE West School is located next to George G. Tyler Elementary School off of John Marshall Highway (SR 55). Buildings located within 500 feet of the I-66 route alternatives are primarily residences; however, there are also some industrial and commercial buildings within 500 feet along the eastern portion of the routes. As shown in Table 4-1, there are eight existing subdivisions crossed by the I-66 Hybrid Alternative Route and three crossed by the I-66 Overhead Alternative Route.

Madison Alternative Route (Gainesville-Haymarket)

There is one church, one cemetery, and two schools located within 500 feet of the Madison Alternative Route. The Gainesville United Methodist Church and cemetery are the same distances and directions from the Madison Alternative Route as the Carver Road Alternative Route discussed above. Buckland Mills Elementary School is located just northeast of Carver Road about 400 feet from the route alternative. The Haymarket Elementary School is located west of James Madison Highway (U.S. 15) and north of Haymarket Drive. School grounds are within 500 feet of the Madison Route, school buildings are greater than 500 feet from the route. Buildings located within 500 feet of this route alternative are primarily residences; however, there are also some industrial and commercial buildings within 500 feet along the eastern portion of the route. As shown in Table 4-1, there are three existing subdivisions crossed by this route alternative.

New Road Alternative Route (New Road-Haymarket-Wheeler)

There are two churches located within 500 feet of the New Road Alternative Route. The Antioch Baptist Church is located at the intersection of Waterfall and Antioch Roads. The Oakrum Baptist Church is located on Thoroughfare Road approximately 0.2 mile north of the intersection with John Marshall Highway (SR 55). Buildings located within 500 feet of this route alternative are primarily residences. As shown in Table 4-1, there are 13 exiting subdivisions crossed by this route alternative.

Northern Alternative Route (Gainesville-Haymarket)

There are no churches, cemeteries, or schools located within 500 feet of the Northern Alternative Route. Buildings located within 500 feet of this route alternative are primarily residences. As shown in Table 4-1, there are 11 existing subdivisions crossed by this route alternative.

Railroad Alternative Route (Gainesville-Haymarket)

There is one church and one cemetery located within 500 feet of the Railroad Alternative Route. The Gainesville United Methodist Church and cemetery are the same distances and directions from the Railroad Alternative Route as the Carver Road Alternative Route discussed above. There are no schools located within 500 feet from this route alternative. Buildings located within

500 feet of this route alternative are primarily residences; however, there are also some industrial and commercial buildings within 500 feet along the eastern portion of the route. As shown in Table 4-1, there are eight existing subdivisions crossed by this route alternative.

Wheeler Alternative Route (Wheeler-Haymarket)

There are no churches, schools, or cemeteries located within 500 feet of the Wheeler Alternative Route. The majority of the buildings located within 500 feet of this route alternative are residences, some associated with the five existing subdivisions located along this alternative.

3.1.4 Existing and Planned Developments

NRG obtained information on existing developments through county parcel and homeowner's association data and obtained information on planned future developments through publicly-available data on county websites, and consultations with county and city planning officials and other stakeholders. The existing subdivisions crossed by the route alternatives are depicted on Figure 7 in Appendix C and listed in Table 3.1.4-1. Planned developments located within 0.25 mile of a route alternative are described below. These planned developments are also depicted on Figure 8 of Appendix C in addition to other planned developments in the vicinity of route alternatives.

Bishops Run

The Bishops Run Preliminary Plan was submitted in 2011. The development would divide approximately 55 acres of land into 95 residential lots. The development would be located on either side of Riley Road just south of Lee Highway (U.S. 29). As of 2011, Fauquier County staff were recommending the approval of the development based on a variety of conditions. These conditions include sidewalk requirements, open space requirements, landscape screening requirements, and basement/floodplain requirements. The Wheeler Alternative and New Road Alternative Routes are within 0.25 mile of this planned development.

Carver Road Property

The Carver Road property encompasses five parcels (about 6.8 acres) east of Carver Road and west of Somerset Crossing Drive. These parcels are currently zoned as agricultural and are being proposed to rezone to allow for the construction of two office buildings. The Carver Road Alternative and Madison Alternative Routes are both within 0.25 mile of this development.

Cushing Road

Cushing Road L.C. has filed for the rezoning of a parcel south of I-66 off of Cushing Road (SR 781). The land is currently zoned as light industrial and is proposed to be zoned as industrial transportation to allow for a package delivery and distribution facility. The facility would be approximately 175,000 square feet. The Carver Road Alternative, Madison Alternative, Northern Alternative, Railroad Alternative, I-66 Hybrid Alternative, and I-66 Overhead Alternative Routes would all cross a small portion (140 feet) of the western portion of this development.

Haymarket Substation and 230 kV Transmission Line Project
Environmental Routing Study

15112001

TABLE 3.1.4-1			
Haymarket Substation and 230 kV Transmission Line Project Existing Subdivisions Crossed by the Proposed Route Alternatives			
Subdivision Name	Location	Approximate Crossing Length (miles)	Route Alternatives Crossed
Hoppman Property	PWC	0.2-0.3	Railroad Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Carver Road Alternative, Madison Alternative
Somerset S3	PWC	0.2	Railroad Alternative
Somerset S1	PWC	0.1	Railroad Alternative
Somerset S4	PWC	0.1	Railroad Alternative
Somerset S5	PWC	0.1	Railroad Alternative
Somerset S6	PWC	0.1	Railroad Alternative
Somerset S7	PWC	0.1	Railroad Alternative
Somerset S8	PWC	<0.1	Railroad Alternative
Heritage Hunt P3 S2	PWC	0.1	Northern Alternative
Heritage Hunt P6 S1	PWC	0.2	Northern Alternative
Heritage Hunt P3 S3	PWC	0.1	Northern Alternative
Heritage Hunt P4 S2	PWC	0.2	Northern Alternative
Heritage Hunt P4 S1	PWC	0.4	Northern Alternative
Piedmont S24	PWC	0.3	Northern Alternative
Carterwood S4	PWC	<0.1	Northern Alternative
Piedmont South S2	PWC	<0.1	I-66 Hybrid Alternative
Piedmont South S4	PWC	0.2	Northern Alternative
Piedmont South S6	PWC	0.2	Northern Alternative
Piedmont South S7	PWC	<0.1-0.1	I-66 Hybrid Alternative and I-66 Overhead Alternative
Piedmont South S8	PWC	0.1	Northern Alternative
Westmarket LB4	PWC	0.2	Northern Alternative
Parks at Piedmont South Condo	PWC	0.1-0.2	I-66 Overhead Alternative and I-66 Hybrid Alternative
Robinsons Paradise	PWC	<0.1	I-66 Hybrid Alternative
Crossroads Villages S2	PWC	<0.1	I-66 Hybrid Alternative
Crossroads Villages S7	PWC	<0.1	I-66 Hybrid Alternative
Crossroads Villages S8	PWC	<0.1	I-66 Hybrid Alternative
South Market S1	PWC	0.1-0.3	New Road Alternative and Wheeler Alternative
Somerset Apts	PWC	<0.1	Carver Road Alternative, Madison Alternative
Gainesville Acres	PWC	<0.1	Madison Alternative
Kennard Ridge S2	PWC	0.1	Carver Road Alternative
Haymarket Overlook	PWN	<0.1	Carver Road Alternative
Falkland Farm Estates S3A	PWC	0.2	New Road Alternative and Wheeler Alternative
Gainesville 96	PWC	0.4	New Road Alternative and Wheeler Alternative
Greenview Estates	PWC	0.1	New Road Alternative and Wheeler Alternative
Pomps Farm Estates	PWC	0.5	New Road Alternative and Wheeler Alternative
Gypsum Hill S4	PWC	<0.1	New Road Alternative
Mill Park Tract	PWC	0.1	New Road Alternative
Mountain View	PWC	0.3	New Road Alternative
Ridgevue	PWC	0.3	New Road Alternative
Shelter Knolls	PWC	0.3	New Road Alternative
The Paddock and Dowden Downs	PWC	0.2	New Road Alternative
Waterfall Farm	PWC	0.3	New Road Alternative
Willie Properties Inc.	PWC	0.7	New Road Alternative

Dominion Hunt

The planned Dominion Hunt development would be located on five parcels east of James Madison Highway (U.S. 15) and south of Thoroughfare Road. A rezoning application has been submitted for the approximately 53 acres area from agricultural to semi-rural residential. The Madison Alternative Route would cross about 0.3 mile of this development.

Gainesville Green

The proposed Gainesville Green development would be located north of Lee Highway (U.S. 29) and east of Old Carolina Road. A Comprehensive Plan amendment has been filed to change the long range land use designation for the approximately 105 acres from suburban residential low and environmental resource to community employment center and environmental resource. This zoning change would allow for future office, retail, and residential development. The Carver Road Alternative and Madison Alternative Routes are located within 0.25 mile of this development.

Gainesville-Haymarket Virginia Railway Express

The proposed Gainesville-Haymarket line for the Virginia Railway Express (VRE) is an approximately 11 mile-project extending from the City of Manassas to just west of the Town of Haymarket. The project would upgrade the existing track on the Norfolk Southern "B" Line Branch and would include up to three stations/platforms with overhead pedestrian bridges and large parking lots. The proposed upgraded track would be the northern of the two tracks in Norfolk Southern Railway's right-of-way. There are currently 10 proposed station locations, 5 of which are located in the vicinity of the Project (Figure 9 in Appendix C).

Concerns have been expressed by local residents and elected officials about the possibility of the proposed transmission line project occupying potential VRE right-of-way along the railroad tracks and precluding the VRE from extending to Haymarket. Dominion has engaged VRE representatives and has designed the alternatives to allow room for both projects to proceed, where there is overlap.

Gardner Station/McGraw's Corner

The proposed Gardner Station/McGraw's Corner development would be located on multiple parcels (approximately 50 acres) south of the Norfolk Southern railroad and north of Nolan Road on lands developed for but currently unused as a recreational vehicle (RV) park. The south side of the currently county dedicated road right-of-way would be developed with commercial space and offices while the north side would consist of residential development and open space. The current plans show 54 townhomes, nearly 230,000 square feet of retail space, and 90,000 square feet for an employment center. The Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes would all cross portions of this planned development.

Haymarket Crossing

The planned Haymarket Crossing development is located on two parcels north and south of I-66 at the westernmost end of Heathcote Boulevard, west of James Madison Highway (U.S. 15). Haymarket Crossing submitted a rezoning request to change about 73 acres of land from agricultural to Planned Business District (PBD) with sub-designations of business and office.

The planned development would include a 120-room hotel and two office buildings. The Northern Alternative Route would cross the southern edge of the planned development for approximately 0.2 mile.

Haymarket Landing

Haymarket Landing is a planned residential development located south of the Norfolk Southern Railroad on either side of Haymarket Drive along Old Carolina Road. The developers have submitted an approved rezoning request that changed the zoning of about 66 acres from agricultural and semi-rural residential to residential 4. The proposed development includes a maximum of 60 single-family detached dwellings with a cluster layout. The Carver Road Alternative and Railroad Alternative Routes would cross varying portions of this planned development. The Madison Alternative Route is located within 0.25 mile of the planned development.

Heathcote Development

The Heathcote Development is a development located on the east side of Old Carolina Road just south of Heathcote Boulevard. The developers have submitted an approved rezoning for the two parcel approximately three acre site from agricultural to office. The proposed development is for a medical office building. The I-66 Hybrid Alternative and I-66 Overhead Alternatives are both located within 0.25 mile of this planned development.

Heritage Hunt Sims Property and Fuel Station

Heritage Hunt is an existing residential development located north of I-66, south of Heathcote Boulevard and east of Catharpin Road. Plans to expand the development south of Heathcote Boulevard were approved and construction is underway. The area shown on Figure 8 includes a portion of the approved planned development applying for a special use permit to allow for a motor vehicle fuel station and retail with quick service food store. The I-66 Overhead Alternative would cross the southern edge of this planned development. The I-66 Hybrid Alternative, Northern Alternative, Carve Road Alternative, Madison Alternative, and Railroad Alternative Routes are all located within 0.25 mile of this planned development.

Hunter at Haymarket

Hunter at Haymarket is a planned mixed-use development located just east of James Madison Highway (U.S. 15) and south of the Town of Haymarket. The approximately 46.5-acre development would contain office space, lodging, retail, and up to 25 single-family detached dwelling units. The Carver Road Alternative, Railroad Alternative, and Madison Alternative Routes would all cross portions of this planned development.

John Marshall Commons

John Marshall Commons is a proposed rezoning area south of I-66 and north of John Marshall Highway (SR 55) between Tyler Elementary School and Gainesville Elementary School. The area is currently zoned as agricultural and industrial and is proposed to change to Planned Mixed Residential (PMR) for a future development. The I-66 Hybrid Alternative and I-66 Overhead Alternative routes are both within 0.25 mile of this planned development.

Market Center at Haymarket

A parcel north of John Marshall Highway (SR 55) and south of I-66 that is part of the Market Center is in the process of a proffer amendment to the existing planned proposal for this area. The proffer amendment includes options for a hotel, office, or office and day care facilities as acceptable uses of already proposed development. Much of the area is already developed with Wal-Mart and Kohl's as anchor stores. The I-66 Hybrid Alternative and I-66 Overhead Alternative Routes would both cross the eastern edge of this planned development. The remaining alternative routes are all within 0.25 mile of this planned development.

Midwood

Midwood LLC and Midwood Center I, LLC are planning on rezoning five parcels located south of John Marshall Highway (SR 55) and North of the Norfolk Southern Railroad just west of the Town of Haymarket from PBD to PMR to permit the development of the Midwood Age-Restricted Community. The community would include a maximum of 550 age-restricted residential units, a community clubhouse with recreation areas, and central open space. All of the alternative routes would cross portions of this planned development with the proposed Haymarket Substation located within the boundaries of the development.

Piedmont Mews Addition

Piedmont Mews is an existing residential subdivision located south of Heathcote Boulevard and north of I-66. The proposed Piedmont Mews Addition is located east of Old Carolina Road near the end of Keavy Ridge Court. The development is approved and will consist of 11 single-family residences on approximately 2.6 acres of land. The I-66 Hybrid Alternative and I-66 Overhead Alternative Routes are within 0.25 mile of this planned development.

Prince William Station

Prince William Station is a planned development located within the abandoned Atlantic Research Corporation Site south of the Norfolk Southern Railroad and near the eastern interconnect site. The area is currently zoned as M-1 and zoning would change to Planned Mixed District (PMD) and PMR. This development has been proposed under various names and would include residential, non-residential office space, a town center, and a potential train station for the proposed VRE Commuter Rail. Dominion has adjusted its alternatives in that area to avoid impacts on the proposed VRE project. None of the route alternatives cross this planned development. The I-66 Hybrid Alternative, I-66 Overhead Alternative, Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes are all located within 0.25 mile of the development.

Regency Somerset

Regency Somerset is a planned development located on the east side of Somerset Crossing Drive just south of the intersection with McGraws Corner Drive. Details on this development are not known at this time. The Carver Road Alternative and Madison Alternative Routes would both cross the northern portion of this planned development.

Somerwood

Somerwood is a planned development located on the west side of Somerset Crossing Drive just south of the intersection with McGraws Corner Drive. The development includes a three-story medical office building with a large parking area on either side of the building. The Carver Road Alternative and Madison Alternative Routes would both cross the northern portion of this planned development.

Terrascape Design Build Company

The proposed Terrascape Design Build Company would be located just south of John Marshall Highway (SR 55) and east of Thoroughfare Road. A special use permit has been filed to request the allowance of a garden center and landscaping business on land zoned as agricultural. The New Road Alternative and Wheeler Alternative Routes are both located within 0.25 mile of this planned development.

University of Virginia Foundation Property

Property owned by the University of Virginia is located just east of James Madison Highway (U.S. 15) and north of Thoroughfare Road. Plans include developing the property as a 150-lot single family residential neighborhood with areas set aside for conservation and recreational use. The Madison Alternative and Carver Road Alternative Routes are both located within 0.25 mile of this planned development.

Village at Heathcote

The Village at Heathcote planned development is located on two parcels just east of James Madison Highway (U.S. 15), one on the north side of Heathcote Boulevard and one on the south side. The developers have submitted an approved rezoning request that changed the zoning on these 27 acres from office and industrial to PBD. The development would include two landbays of mixed-use development including retail, financial, child care, and office space. The Northern Alternative Route would cross the eastern edge of the southern parcel. The I-66 Hybrid Alternative and the I-66 Overhead Alternative Routes are both located within 0.25 mile of this planned development.

Villages at Piedmont II

The Villages at Piedmont is an approved planned development that is located on multiple parcels along the west side of James Madison Highway (U.S. 15) and Thoroughfare Road and in total will encompass nearly 500 acres. Approximately 48 acres have been zoned as residential and 6 suburban residential and will contain up to 261 single-family homes. Another 59 acres are zoned residential 4 and will contain up to 132 single-family detached dwelling units. Approximately 340 acres have been zoned as agricultural and will remain open space for preservation, passive recreation (including a trail network), and a commuter parking lot. The Wheeler Alternative and New Road Alternative Routes would both cross portions of this planned development. The Madison Alternative right-of-way would also cross the eastern edge of the planned development where it is adjacent to the James Madison Highway (U.S. 15).

Village Place at Gainesville

Village Place at Gainesville is an existing residential subdivision located north of the Norfolk Southern Railroad and south of John Marshall Highway (SR 55). The approximately 50-acre undeveloped parcel located to the southeast of the existing development is also owned by the Village Place at Gainesville and is proposed for multi-family residential development. The Carver Road Alternative, Madison Alternative, and Railroad Alternative Routes would all cross portions of this planned development.

Vint Hill

Vint Hill is an existing residential and commercial development with over 60 businesses established within the development. The existing development area is located north of Rogues Road and south of Vint Hill Road. Proposed redevelopment would be located within the existing boundary of Vint Hill Station but with proposed new land uses including innovative technology, retail, transitional housing, and assisted living. Vint Hill has Planned Commercial Industrial Development zoning approval for commercial development and retail development in the village center. The Wheeler Alternative and the New Road Alternative Routes are both within 0.25 mile of this planned development.

Woodbourne

Woodbourne is a planned residential development currently in the early planning process. The development has filed a rezoning application with Prince William County to rezone about 88 acres from agricultural to semi-rural residential cluster, semi-rural residential, and environmental resource. The development is south of Thoroughfare Road and west of Melton Court. The Madison Alternative Route would cross portions of this planned development.

3.1.5 Land Use Planning and Zoning

The Virginia Code requires every governing body within the state to adopt a plan, called a Comprehensive Plan, to provide guidance for land planning decisions within the territory of its jurisdiction. The Comprehensive Plan identifies and describes the location, character, and extent of existing, proposed, or anticipated land uses, and identifies facilities (e.g., roads, housing, utilities, libraries) needed to serve current and future residents. Zoning, which is a power granted to governing bodies to regulate land uses, is a tool used by land managers to implement the objectives of the Comprehensive Plan by defining standards for development and permissible uses within different land use categories. Comprehensive Plans are updated every five years to make adjustments for actual or projected changes in land use conditions or needs. Zoning ordinances may be modified by land managers or governing bodies or through requests from residents or businesses to change zoning designations or approve new uses.

Prince William County, Fauquier County, Loudoun County, and the Town of Haymarket have adopted Comprehensive Plans and zoning ordinances for their respective jurisdictions. NRG obtained GIS data sets for zoning districts from the Prince William County and Fauquier County. Town of Haymarket and Loudoun County zoning districts were obtained from publicly-available zoning maps. Zoning categories vary between Fauquier County, Prince William County, Loudoun County, and the Town of Haymarket. Zoning categories were grouped into the following categories: Agricultural, Industrial, Business/Commercial, Planned Business District, Planned Mixed District, Planned Mixed Residential, Residential, Conservation, and Uncategorized/Right-of-way.

In addition to Comprehensive Plans and zoning ordinances, Fauquier County also contains service districts. Fauquier County has designated six service districts to accommodate the highest density residential, commercial, and industrial uses in the county. Service districts are either currently served with public utilities or planned for the future service of some type of public utility (e.g., water, public sewer). Since 1967, the Fauquier County Comprehensive Plan has included goals to concentrate and guide county growth into these service districts. The New Baltimore Service District is located within the Project area and would be crossed by the Wheeler Alternative Route as shown in Figure 10 in Appendix C.

Prince William County has also designated a Rural Area, better known as the Rural Crescent, which covers approximately 80,000 acres and includes lands in the southwest corner and northeastern portion of the Project area as shown in Figure 7. The purpose of the Rural Crescent is to help preserve the county's agricultural economy and resources, agricultural landscapes, cultural resources, groundwater supply, open space, and rural character. This area is generally limited to development restrictions of one home per 10 acres. The area contains primarily agricultural, open space, forestry, and large-lot residential land uses.

The Carver Road Alternative Route crosses land predominantly zoned as Agricultural. The route starts on a parcel zoned as Industrial and continues for 2.2 miles on land zoned as Agricultural land. This segment of the route primarily follows the northern side of I-66. The route then continues across 0.1 mile of land zoned as Industrial and crosses 0.6 mile of land zoned as Business with small pockets of land zoned as Industrial (<0.1 mile) and Agricultural (0.1 mile) in between. After crossing the John Marshall Highway (SR 55), the route continues on 0.1 mile of Agricultural zoned land and then crosses 0.3 mile of Industrial zoned land. The route then crosses 0.1 mile of PMD zoned land before crossing the Norfolk Southern Railroad, and continues on 0.3 mile of Agricultural zoned land. The route then crosses a short (<0.1 mile) stretch of Business zoned land, 0.3 mile of Agricultural zoned land, and about 0.1 mile of Residential zoned land. After crossing short stretches (about 100 feet) of Business, Residential, and Office zoned land, the route continues for about 0.2 mile on Agricultural zoned land and crosses Carver Road. The route then continues in a generally northwest direction and crosses and additional about 0.9 mile of Agricultural zoned land. The route then crosses 0.6 mile of Residential zoned land and heads west crossing 0.3 mile of Business/Commercial zoned land. The route then crosses about 50 feet of industrial zoned land, crosses James Madison Highway (U.S. 15), and continues on another short stretch of industrial zoned land before crossing the Norfolk Southern Railroad. The route then continues along 0.2 mile of Industrial land and 0.2 mile across PBD land, before reaching the proposed Haymarket Substation.

The I-66 Hybrid Alternative Route also crosses land predominantly zoned as Agricultural. From the tie-in location, the route crosses the same zoning categories for the first 2.2 miles as the Carver Road Alternative Route described above, until it reaches the transition station, where an overhead to underground transition would occur after the route crosses the Lee Highway (U.S. 29). The route then follows the southern side of I-66 crossing 0.3 mile of Agricultural land, 0.4 mile of Business/Commercial zoned land, <0.1 mile of Agricultural, and 0.1 mile of Industrial land before crossing I-66. Heading in a northwesterly direction, the route follows the northern side of I-66 crossing 0.1 mile of Agricultural land, 0.1 mile of Residential land, and less than 0.1 mile of PMR land. For the next 0.4 mile, the route zigs in and out of Agricultural and PMR zoned land. The route then enters the Town of Haymarket and continues to follow the northern side of I-66 for approximately 0.5 mile within the road right-of-way and 0.1 mile of residential zoned land. After crossing I-66, the route continues to follow the southern side of I-66 for another 0.2 mile within the road right-of-way, 0.3 mile across Business/Commercial zoned land, and less than 0.1 mile of road right-of-way. The route then crosses James Madison Highway

(U.S. 15) and continues to cross 0.1 mile of PMD land. It then crosses John Marshall Highway (SR 55) and continues for 0.2 mile across Industrial zoned land. Lastly, the route terminates into the proposed Haymarket Substation, which is zoned as PBD.

The I-66 Overhead Alternative Route crosses land predominantly zoned as Agricultural. From the tie-in location, the route crosses the same zoning categories for the first 2.1 miles as the Carver Road Alternative Route described above, until a point just after the crossing of Lee Highway (U.S. 29). The route then heads northeast crossing 0.3 mile of Agricultural land and following the southern side of I-66. The route then crosses I-66, crossing 0.1 mile of PMR land, less than 0.1 mile of Agricultural land, and another 0.2 mile of PMR land. Continuing west, the route crosses Catharpin Road and 0.5 mile of Agricultural land before following the edge of Agricultural and PMR zoned land for 0.3 mile. The route then enters the Town of Haymarket and heads in a general westerly direction for 0.7 mile within the road right-of-way. The route then crosses about 0.2 mile of Business/Commercial zoned land and less than 0.1 mile of road right-of-way. The route then crosses James Madison Highway (U.S. 15) and continues to cross 0.1 mile of PMD land. It then crosses John Marshall Highway (SR 55) and continues for 0.2 mile across Industrial zoned land. Lastly, the route terminates into the proposed Haymarket Substation which is zoned as PBD.

The Madison Alternative Route crosses land predominantly zoned as Agricultural. From the tie-in location, the route crosses the same zoning categories for the first 4.7 miles as the Carver Road Alternative Route described above. The route breaks off from the Carver Road Alternative about 0.3 mile after crossing Carver Road and continues in a general westerly direction the route crosses 1.7 miles of Agricultural zoned land before crossing James Madison Highway (U.S. 15). After crossing James Madison Highway (U.S. 15) the route then heads north following the western side of the highway for 0.7 mile on Agricultural zoned land and two small (less than 50 feet) stretches of Business and Office zoned land. The route then crosses about 50 feet of industrial zoned land, crosses James Madison Highway (U.S. 15), and continues on another short stretch of industrial zoned land before crossing the Norfolk Southern Railroad. The route then continues along 0.2 mile of Industrial land and 0.2 mile across PBD land, before reaching the proposed Haymarket Substation.

The New Road Alternative Route crosses land predominately zoned as Agricultural. The first portion of the route starts on a parcel in Loudoun County zoned as Agricultural. The alternative skirts in and out of Loudoun and Prince William Counties for the first 1.0 mile of the route, jumping back and forth between Agricultural and Residential zoned land. The route then stays in Prince William County and continues on Agricultural zoned land for about 5.2 miles. After crossing Waterfall Road (SR 601), the route crosses a small 220-foot parcel zoned as Residential Planned Community (RPC) and then continues in a generally southern direction for 5.7 miles on land zoned as Agricultural. The route then continues for about 0.4 mile on PBD zoned land with a small section (250 feet) crossing Agricultural zoned and then terminating at the proposed Haymarket Substation on PBD zoned land.

The second part of the New Road Alternative Route leaves the Wheeler Station in Prince William County and crosses 0.8 mile of land zoned as Agricultural. The route then enters Fauquier County and continues for 3.2 miles entirely on Agricultural land. The route then re-enters Prince William County and crosses a 4.0-mile stretch of Agricultural zoned land. Lastly, the route continues for about 0.4 mile on PBD zoned land with a small section (250 feet) crossing Agricultural zoned and then terminating at the proposed Haymarket Substation.

The Northern Alternative Route crosses land predominantly zoned as Agricultural. From the tie-in location, the route crosses the same zoning categories for the first 1.4 miles as the Carver Road Alternative Route described above. The route then deviates from the Carver Alternative and continues on 1.2 miles on land zoned as Agricultural land. The route then continues for 1.3 miles on PMR land, then crossing a small stretch (160 feet) of Residential land, before continuing for 0.9 mile across PMR land and crossing Old Carolina Road. Heading in a general westerly direction, the route then crosses 0.2 mile of land zoned as Residential before heading south and crossing 0.1 mile of land zoned as Business/Commercial. The route then crosses James Madison Highway (U.S. 15) and continues on 0.1 mile of PBD land before crossing 0.1 mile of land zoned as Agricultural and then continuing across an additional 0.6 mile of PMD zoned land. After crossing I-66 the route continues along about 0.1 mile of PBD land before crossing John Marshall Highway (SR 55) and reaching the proposed Haymarket Substation.

The Railroad Alternative Route crosses land predominantly zoned as Industrial. From the tie-in location, the route crosses the same zoning categories for the first 3.5 miles as the Carver Road Alternative Route described above. The route then breaks off from the Carver Road Alternative Route and then crosses a small 0.1 mile stretch of PMD zoned land and then 0.2 mile of Agricultural land. The route then continues across 0.6 mile of Residential zoned land before entering into the Town of Haymarket, where it crosses 0.2 mile of Conservation zoned lands, leaves the Town of Haymarket crossing 0.1 mile of Agricultural land, 0.3 mile of Residential land, and 0.3 mile of Business/Commercial zone land. The route then crosses about 50 feet of Industrial zoned land before crossing the James Madison Highway (U.S. 15). After crossing the James Madison Highway (U.S. 15) the route crosses another short stretch of Industrial zoned land before crossing the Norfolk Southern Railroad, and continues for 0.2 mile along Industrial land and 0.2 mile across PBD land, before reaching the proposed Haymarket Substation.

The Wheeler Alternative Route crosses land predominantly zoned as Agricultural. The description of the Wheeler Alternative Route is the same as the description of the second part of the New Road Alternative Route described above.

NRG reviewed county zoning ordinances and Comprehensive Plans for Prince William County, Fauquier County, Loudoun County, and the Town of Haymarket to identify potential conflicts with zoning and the proposed Project. As indicated below, Prince William County and the Town of Haymarket require a special use permit for certain utilities. However, according to Va. Code § 56.46.1 F, SCC approval of transmission lines 138 kV and above preempts local zoning ordinance and special use permitting.

In Fauquier County, structure height restrictions do not apply to transmission towers and cables. Per Part 3-300 of the zoning ordinance, transmission lines not subject to SCC review fall under special exemption use for all zoning categories; however, no indication is made for those transmission lines that are subject to SCC review. Per Part 4-406 of the zoning ordinance, transmission lines are considered a special exception use within the floodplain overlay district (Fauquier County, 2013b).

In Prince William County, public facilities, including utilities, are approved uses in all zoning districts, but require review by the Planning Commission for compatibility with the objectives of the Comprehensive Plan. In Loudoun County, zoning ordinance section 1-103 part D includes exemptions to the ordinance. One exemption states that electric transmission lines of 150 kV or more that are approved by the SCC will be deemed to have satisfied the requirements of the ordinance. In the Town of Haymarket, some zoning districts require special use permits for

transmission lines. In all of these jurisdictions, SCC-approved electric transmission lines are exempt from local review.

Select land use classifications and zoning districts nonetheless were considered routing constraints in this study due to the potential for a transmission line to conflict with existing or planned land uses. These include areas zoned or planned for residential developments or areas designated for preservation as parkland or open space.

3.1.6 Conservation Easements

The Virginia Open-Space Land Act provides for the creation of open-space easements by public bodies as a means of preserving open space or significant natural, cultural, and recreational resources on public or private lands. Most easements created under the Act are held by the Virginia Outdoors Foundation (VOF), but any state agency is authorized to create and hold an open-space easement. The Virginia Conservation Easement Act similarly provides for the creation of conservation easements on public or private lands but under the auspices of charitable organizations (such as conservation trusts) rather than public agencies. In both cases, easements are designed to preserve and protect open space or other resources in perpetuity. Easements negotiated with private landowners allow the lands to remain in private ownership but with protections imposed to limit or restrict land uses on the property.

Virginia Outdoors Foundation

The VOF is Virginia's leader in land conservation, protecting over 675,000 acres across the state. The VOF was created under the Virginia Open-Space Land Act, which provides for the creation of open-space easements by public bodies as a means of preserving open space or significant natural, cultural, and recreational resources on public or private lands. Most easements created under the Act are held by the VOF, but any state agency is authorized to create and hold an open-space easement. There are currently no VOF easements that would be crossed by any of the route alternatives.

Northern Virginia Conservation Trust

The Northern Virginia Conservation Trust (NVCT) is a nonprofit organization that helps permanently conserve land by working with landowners who voluntarily agree to legal restrictions to conserve their lands. The NVCT follows the national standards and practices of the Land Trust Alliance and is accredited by the Land Trust Accreditation Commission. NVCT easements within the project area are private, open space easements.

Agricultural and Forestal Districts

The Virginia Agricultural and Forestal Districts (AFD) Act provides for the creation of conservation districts. These districts are designed to conserve, protect, and encourage the development and improvement of a locality's agricultural and forested lands for the production of food and other products, while also conserving and protecting land as valued natural and ecological resources. These districts are voluntary agreements between landowners and the locality, and offer benefits to landowners when they agree to keep their land in its current use for between 4 and 10 years. A district must contain at least 200 acres. Both Fauquier and Prince William Counties have developed AFDs (Commonwealth of Virginia, 1997); however, none would be crossed by any of the route alternatives.

Prince William County Easements

Prince William County has designated areas within its Comprehensive Plan as protected open space. The Plan defines open space as “land that is not dominated by man-made structures” and may include nature preserves, parks, forests, wetlands, historic sites, and farms. Protected open space is “protected in perpetuity by a binding legal instrument that is recorded in the land records of Prince William County.” The instrument may be a preservation easement, permanent restrictive covenant for conservation, or an equivalent legal tool providing protection. Generally these protected open spaces fall into one of the following categories: county-owned land, state and federal parks, forests, or wildlife preserves, land designated as a Resource Protection Area (RPA) under the Chesapeake Bay Preservation Act (CBPA), or land protected by easements (Prince William County, 2007).

NRG identified 11 protected open-space areas that would be crossed by various route alternatives. As shown on Figure 11 in Appendix C, these protected spaces consist of open space associated with homeowners associations, Conway-Robinson Memorial State Forest, North Fork Wetlands Bank, Elizabeth Nickens Park, and areas surrounding Lake Manassas (including some tributaries).

During development of route alternatives for the Project, Prince William County accepted a gift Open Space and Trail easement from the Somerset Crossing Homeowners Association. The open-space easement was intended to protect woodlands and wetlands along North Fork Broad Run. The trail easement was intended to provide recreational access to the open space easement. Development within the easement requires approval from Prince William County. The Railroad Alternative Route would cross the open-space easement for 0.8 mile.

Fauquier County Easements

Fauquier County has three types of open-space easements: Board of County Supervisors (BOS) regulated, non-common open space, and common open space. The purpose of open-space easements is to protect and conserve natural, scenic, and/or historic resources in open-space areas. These can include: forestal lands, environmentally sensitive areas, predominant geologic features, and prime agricultural land.

The Fauquier County BOS easements operate similarly to VOF easements where a landowner voluntarily donates their land into easement. In some instances, BOS easements overlap with non-common open-space easements. The Fauquier County Zoning Ordinance requires a minimum amount of non-common open space to be provided for both clustered and conventional subdivisions in rural districts. For residential subdivisions, the property owner is required to place 85 percent of the total land in the original parcel in an open-space easement. This requirement applies to parcels that were originally 30 acres or greater. The non-common open-space easement limits further development of the property and it is generally assumed that the property is preserved for agricultural use (Fauquier County, 2010b, 2013b).

Per the Fauquier County zoning ordinance, common open-space easements are lands designed for the mutual benefit of a group of people living in a development. These lands are not available for use by the general public (Fauquier County, 2013b). These lands typically are located surrounding a housing development and within the project area consist of both open and forested lands. The developer has to establish a non-profit organization or other legal entity for the ownership, maintenance, and care of the land. All of the common open-space easements crossed by route alternatives are owned and operated by various homeowners

associations. The organization in charge of the easement can change the status of open space from common to non-common provided they adhere to all non-common open-space regulations.

NRG routed around Fauquier County easements; therefore, no easements are crossed by any of the route alternatives.

3.1.7 Other Conservation Lands

NRG obtained information on other conservation lands through review of a digital dataset obtained from the Virginia Department of Conservation and Recreation (VDCR). The dataset identifies "lands of conservation and recreational interest" in Virginia, including federal, state, local, and privately-owned lands. NRG's review of the dataset identified that there is one area of VDCR conservation land crossed by one of the route alternatives. This area is associated with the Conway-Robinson Memorial State Forest and is crossed by the Northern Alternative Route.

3.1.8 Transportation

The closest federally-regulated airport to any of the route alternatives under consideration is the Manassas Regional Airport, located approximately 5.0 miles southeast of the easternmost tie-in location. The airport is a city-owned public use airport. NRG conducted an aerial review and web search of the project area to search for privately-owned and -operated airfields/strips or helicopter pads located near the route alternatives. No such facilities were found.

NRG identified 25 road crossings along the Carver Road Alternative Route. Nine of these crossings are of county or local roads and 16 are of state or U.S. highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are: I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on-ramp (two crossings), I-66 West Exit 44 off-ramp (2 crossings), University Boulevard, I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, Lee Highway (U.S. 29), I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, I-66 West, I-66 East, Daves Store Lane (three crossings), John Marshall Highway (SR 55), Bellingham Drive, Somerset Crossing Drive (SR 3310), Carver Road (SR 647), Old Carolina Road (SR 703), Haymarket Drive (SR 625), and James Madison Highway (U.S. 15).

NRG identified 25 road crossings along the I-66 Hybrid Alternative Route. Five of these crossings are of county or local roads and 20 are of state or U.S. highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on-ramp (two crossings), I-66 West Exit 44 off-ramp (2 crossings), University Boulevard, I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, Lee Highway (U.S. 29), I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, I-66 West, I-66 East, Catharpin Road (SR 676), I-66 East, I-66 West, Jordan Lane (SR 1303), Jefferson Street (SR 625), Walter Robinson Lane, I-66 West, I-66 East, James Madison Highway (U.S. 15), and John Marshall Highway (SR 55).

NRG identified 20 road crossings along the I-66 Overhead Alternative Route. Four of these crossings are of county or local roads and 16 are of state or U.S. highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on-ramp (two crossings), I-66 West Exit 44 off-ramp (2 crossings), University Boulevard, I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, Lee Highway (U.S. 29), I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp,

Larapinta Court, Catharpin Road (SR 676), Jefferson Street (SR 625), I-66 West, I-66 East, James Madison Highway (U.S. 15), and John Marshall Highway (SR 55).

NRG identified 28 road crossings along the Madison Alternative Route. Twelve of these crossings are of county or local roads and 16 are of state or U.S. highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are: I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on-ramp (two crossings), I-66 West Exit 44 off-ramp (2 crossings), University Boulevard, I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, Lee Highway (U.S. 29), I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, I-66 West, I-66 East, Daves Store Lane (three crossings), John Marshall Highway (SR 55), Bellingham Drive, Somerset Crossing Drive (SR 3310), Carver Road (SR 647), Old Carolina Road (SR 703), Thoroughfare Road (SR 682), James Madison Highway (U.S. 15), Thoroughfare Road (SR 682), Hokie Place, Market Ridge Boulevard, and James Madison Highway (U.S. 15).

NRG identified 25 roads along the New Road Alternative Route. Sixteen of the road crossings are along the first part of the New Road Alternative Route, including 11 crossings of county or local roads and 5 crossings of state or U.S. highways. From the New Road Substation to the proposed Haymarket Substation these road crossings are: Logmill Road (SR 701), Shelter Lane (SR 601), Sudley Road (SR 234), James Madison Highway (U.S. 15), Waterfall Road (SR 601), Mill Creek Road (SR 630), Waterfall Road (SR 601), Dogwood Tree Court, Mountain View Drive (SR 1745), Antioch Road (SR 681), Thoroughfare Road (SR 682), I-66 West, I-66 East, John Marshall Highway (SR 55), Thoroughfare Road (SR 682), and Charles Street.

Nine of the crossings are along the second part of the New Road Alternative Route, including seven crossings of county or local roads and two crossings of state or U.S. highways. From the tie-in location off of Vint Hill Road (SR 215) to the proposed Haymarket Substation these road crossings are: Buckland Mills Road (SR 684), Acorn Farm Lane, Vint Hill Road (SR 215), Broad Run Church Road (SR 600), Lee Highway (U.S. 15), Beverly Road (SR 716), Beverly Road (SR 716), Thoroughfare Road (SR 682), and Charles Street (SR 1307).

NRG identified 18 road crossings along the Northern Alternative Route. Five of these crossings are of county or local roads and 13 are of state or U.S. highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are: I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on ramp, I-66 West Exit off-ramp, I-66 West Exit off-ramp, I-66 West Exit 44 on ramp, University Boulevard, I-66 West Exit 43 off-ramp, Lee Highway (U.S. 29), Heritage Hunt Drive, Catharpin Road (SR 676), Old Carolina Road (SR 625), Heathcote Boulevard, James Madison Highway (U.S. 15), I-66 East, I-66 West, and John Marshall Highway (SR 55).

NRG identified 22 road crossings along the Railroad Alternative Route. Six of these crossings are of county or local roads and 16 are of U.S. or state highways. From the tie-in on the converted Line #124 to the proposed Haymarket Substation these road crossings are: I-66 East Exit 44 on-ramp, I-66 East, I-66 West, I-66 West Exit 44 on-ramp (two crossings), I-66 West Exit 44 off-ramp (2 crossings), University Boulevard, I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, Lee Highway (U.S. 29), I-66 West Exit 43 off-ramp, I-66 West Exit 43 on-ramp, I-66 West, I-66 East, Daves Store Lane (three crossings), John Marshall Highway (SR 55), Jefferson Street (SR 625), Kapp Valley Way, and James Madison Highway (U.S. 15).

NRG identified a total of nine roads along the Wheeler Alternative Route, including seven crossings of county or local roads and two crossings of state or U.S. highways. From the tie-in

location off of Vint Hill Road (SR 215) to the proposed Haymarket Substation these road crossings are: Buckland Mills Road (SR 684), Acorn Farm Lane, Vint Hill Road (SR 215), Broad Run Church Road (SR 600), Lee Highway (U.S. 15), Beverly Road (SR 716), Beverly Road (SR 716), Thoroughfare Road (SR 682), and Charles Street (SR 1307).

3.2 Environmental Constraints

NRG utilized several desktop data sources to map wetlands and waterbodies within the proposed right-of-way corridors. These sources included USGS 7.5 minute series topographic quadrangle maps, National Wetlands Inventory (NWI) maps obtained from the U.S. Fish and Wildlife Service (FWS), soils data from the Natural Resources Conservation Service Web Soil Survey, recent aerial photography, and National Hydrography Dataset (NHD) stream layers. NRG did not conduct an onsite wetland delineation of wetlands or waterbodies within the study area. However, the intent of the desktop review of these Project areas was to estimate wetland boundaries and refine the Cowardin cover classification (Cowardin, 1979) from the more general FWS NWI-delineated areas for comparison purposes to provide the most representative sense of wetlands crossed by the project. Although this degree of wetland refinement provides details necessary for initial routing, the data gathered herein should only be used for planning purposes. This desktop analysis was completed for the Carver Road Alternative, I-66 Hybrid Alternative, I-66 Overhead Alternative, Madison Alternative, Railroad Alternative, and Wheeler Alternative Routes. The New Road Alternative and Northern Alternative Routes were not included in the desktop analysis and NWI data was used for calculating impacts along these two routes.

3.2.1 Wetlands

A quantification of the various wetlands types crossed by each of the routes is provided in the Environmental Features Comparison Table included as Table 4-1. In addition, an overview map set illustrating the location of NWI wetlands is included on Figure 12 in Appendix C.

Carver Road Alternative Route (Gainesville-Haymarket)

Wetlands along the Carver Road Alternative Route are predominantly Palustrine Forested (PFO). Wetlands crossed by the route include PFO, Palustrine Emergent (PEM) and, Palustrine Unconsolidated (PUB) wetlands scattered along the eastern portion of the route and larger forested and emergent complexes surrounding North Fork Broad Run. As the route moves westward, it crosses a few smaller PFO wetlands including one surrounding a tributary to North Fork Broad Run and a second crossing of North Fork Broad Run.

I-66 Hybrid Alternative Route (Gainesville-Haymarket)

Wetlands along the I-66 Hybrid Alternative Route are predominantly PFO wetlands. The route would cross the same wetlands along the eastern portion of the route as the Carver Road Alternative Route. After diverging from the Carver Road Alternative Route, the route continues across a PFO wetland and crosses multiple smaller PFO and PEM wetlands along I-66 and near the proposed Haymarket Substation.

I-66 Overhead Alternative Route (Gainesville-Haymarket)

Wetlands along the I-66 Overhead Alternative Route are predominantly PFO wetlands and are similar to the wetlands that would be crossed by the I-66 Hybrid Alternative Route.

Madison Alternative Route (Gainesville-Haymarket)

Wetlands along the Carver Road Alternative Route are PFO and include PFO, PEM and, PUB wetlands scattered along the eastern portion of the route and larger forested and emergent complexes surrounding North Fork Broad Run. As the route moves west and breaks off from the Carver Road Alternative Route the route crosses a few isolated PFO wetlands and larger PFO complexes associate with a tributary of North Fork Broad Run.

New Road Alternative Route (New Road-Haymarket-Wheeler)

Wetlands along the New Road Alternative Route are predominantly PFO and PEM wetlands. Along the first portion of the alternative these wetlands are primarily located along Bull Run, tributaries to Chestnut Lick, Catharpin Creek, Little Bull Run, North Fork Broad Run, and tributaries to North Fork Broad Run. Wetlands along the second portion of the New Road Alternative Route are location along tributaries to Lake Manassas, South Run, tributaries to Broad Run, and North Fork Broad Run.

Northern Alternative Route (Gainesville-Haymarket)

Wetlands along the Northern Alternative Route are primarily PFO and PEM wetlands located along Young's Branch, within Conway-Robinson Memorial State Forest, and along Little Bull Run, which the alternative parallels for about 2.5 miles.

Railroad Alternative Route (Gainesville-Haymarket)

Wetlands along the Carver Road Alternative Route are predominantly PFO and include PFO, PEM and, PUB wetlands scattered along the eastern portion of the route and larger forested and emergent complexes surrounding North Fork Broad Run, which the alternative parallels for about 1.4 miles.

Wheeler Alternative Route (Wheeler-Haymarket)

Wetlands along the Wheeler Alternative Route are location along tributaries to Lake Manassas, South Run, tributaries to Broad Run, and North Fork Broad Run.

3.2.2 Waterbodies

NRG identified and mapped waterbodies in the study area using publicly-available GIS databases, USGS topographic maps (1:24,000), and recent (2012) digital aerial photography. Crossings of waterbodies were considered constraints in this study due to the potential for an electric transmission line to impact biological resources (such as riparian vegetation or habitat for sensitive species) within and adjacent to the streams.

A general location map that illustrates waterbodies that are crossed by the various route alternatives is included as Figure 12 in Appendix C. Although these streams would not require a Rivers and Harbors Act Section 10 authorization, activities within and over subaqueous lands of Virginia require a permit from the Virginia Marine Resources Commission pursuant to Va. Code § 28.2-1205.

Carver Road Alternative Route (Gainesville-Haymarket)

The Carver Road Alternative Route crosses a variety of intermittent and perennial waterbodies including: Young's Branch, a tributary to Rocky Branch, two crossings of North Fork Broad Run, and two crossings of tributaries to North Fork Broad Run. The largest waterbody crossing along the route is an unnamed pond located just east of Carver Road with a crossing width of about 110 feet.

I-66 Hybrid Alternative Route (Gainesville-Haymarket)

The I-66 Hybrid Alternative Route crosses a variety of intermittent waterbodies including: Young's Branch, a tributary to Rocky Branch, and multiple tributaries to Little Bull Run. Crossing widths are expected to be minimal (approximately 5 feet) and are not visible on aerial photography.

I-66 Overhead Alternative Route (Gainesville-Haymarket)

The I-66 Overhead Alternative Route crosses a variety of intermittent waterbodies including: Young's Branch, a tributary to Rocky Branch, and multiple tributaries to Little Bull Run. Crossing widths are expected to be minimal (approximately 5 feet) and are not visible on aerial photography.

Madison Alternative Route (Gainesville-Haymarket)

The Madison Alternative Route crosses a variety of intermittent and perennial waterbodies including: Young's Branch, a tributary to Rocky Branch, two crossings of North Fork Broad Run, and two crossings of tributaries to North Fork Broad Run. The largest waterbody crossing along the route is the same crossing of the unnamed pond described above for the Carver Road Alternative Route where the width of the waterbody is approximately 110 feet.

New Road Alternative Route (New Road-Haymarket-Wheeler)

The first portion of the New Road Alternative Route crosses a variety of intermittent and perennial waterbodies including: multiple crossings of Bull Run and its tributaries, Black Branch, Chestnut Lick and its tributaries, Catharpin Creek, Little Bull Run, and tributaries of North Fork Broad Run. Waterbody crossing lengths vary in width across the route with the largest being a crossing of Black Branch at approximately 80 feet.

The second portion of the New Road Alternative Route crosses a variety of intermittent and perennial waterbodies including: tributaries to Lake Manassas, South Run, Broad Run and its tributaries, and North Fork Broad Run and its tributaries.

Northern Alternative Route (Gainesville-Haymarket)

The Northern Alternative Route crosses a variety of intermittent and perennial waterbodies including Young's Branch and Little Bull Run and its tributaries. The route parallels Little Bull Run for approximately 2.5 miles. Crossings of Little Bull Run vary in width from approximately 20 feet to 300 feet.

Railroad Alternative Route (Gainesville-Haymarket)

The Railroad Alternative Route crosses a variety of intermittent and perennial waterbodies including: Young's Branch, a tributary to Rocky Branch, multiple crossings of North Fork Broad Run, and its tributaries. The crossings of North Fork Broad Run range in width from approximately 30 feet to 60 feet.

Wheeler Alternative Route (Wheeler-Haymarket)

The Wheeler Alternative Route crosses a variety of intermittent and perennial waterbodies including: tributaries to Lake Manassas, South Run, Broad Run and its tributaries, and North Fork Broad Run and its tributaries. Crossing along this alternative vary in width with the largest crossing being of Broad Run at approximately 20 feet.

3.2.3 Resource Protection Areas

The CBPA (Va. Code § 62.1-44.15:67 *et seq.*) establishes a program to protect and improve the quality of water of the Chesapeake Bay (Va. Code § 62.1-44.15:72 and 9 VAC 25-830-10 *et seq.*). The focus of the CBPA is to protect sensitive land areas that are adjacent to tributaries of the bay and its tributaries. Areas protected under the CBPA and designated as RPAs by localities are sensitive lands at or near the shoreline that have an intrinsic water quality value due to the ecological and biological processes they perform (see Va. Code §§ 62.1-44.15:68 and 62.1-195.1). RPA components include tidal wetlands, tidal shores, non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or tributary streams, and a minimum 100-foot buffer landward of the other RPA components. Prince William County has incorporated the CBPA into its zoning ordinances to implement requirements for protecting and improving water quality RPAs.

Activities or facilities prohibited in RPAs include new developments, parking lots, filling and grading, establishing lawns, and clearing trees. Activities or facilities permitted in RPAs (with county approval) include water dependent facilities (such as docks), replacement of existing structures to the original footprint, water wells, boardwalks or trails, public utility structures, select tree clearing for sight lines, and removal of dead or noxious vegetation. NRG obtained information on RPAs in the study area from the Prince William County Office of Information Technology. The RPAs identified in the Project area are located along Rocky Branch, North Fork Broad Run, Little Bull Run, Catharpin Creek, Chestnut Lick, Black Branch, Bull Run, Broad Run and Lake Manassas and its tributaries (Figure 13 in Appendix C).

As noted above, electric transmission lines approved by the SCC do not require review under the local zoning ordinances and, therefore, are not subject to restrictions in RPAs. Nonetheless, RPAs were identified as constraints in this study given the potential for new facilities to impact these areas (e.g., as a result of tree clearing or filling to support tower structures in wetlands).

3.2.4 Areas of Ecological Significance

NRG reviewed the VDCR's Natural Heritage Resources Program (NHR Program) screening dataset to identify areas of ecological significance within the project area. As described below, the dataset includes three components: Conservation Sites, Stream Conservation Units (SCU), and General Location Areas.

1. Conservation Sites identify a planning boundary delineating the NHR Program's best determination of the land and water area occupied by one or more natural heritage resources (exemplary natural communities and rare species) and are necessary to maintain ecological processes that will facilitate their long-term survival. The size and dimensions of a conservation site are based on the habitat requirements of the natural heritage resources present and the physical features of the surrounding landscape. Features taken into consideration include hydrology, slope, aspect, vegetation structure, current land uses, and potential threats from invasive species. Conservation sites do not necessarily preclude human activities, but a site's viability may be greatly influenced by human activities. Conservation sites may require ecological management, such as invasive species control or water management, in order to maintain or enhance their viability. Each conservation site is given a biodiversity significance ranking based on rarity, quality, and number of natural heritage resources it contains.
2. SCUs identify stream reaches that contain aquatic natural heritage resources, including upstream and downstream buffers and tributaries associated with the reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of natural heritage resources they contain. SCUs can be used to identify land management needs and protection priorities.
3. General Location Areas for Natural Heritage Resources represent the approximate locations of documented natural heritage resource occurrences that were not incorporated into Conservation Sites, either because they are poor quality, their location was not precisely identified, or they have not been verified in over 20 years. These approximate locations, marked with a one-mile-diameter circle, are included in the Screening Coverage because they indicate areas with relatively high potential for natural heritage resource occurrences to be documented. Depending on the apparent suitability of local habitat, VDCR may recommend biological surveys when reviewing projects that intersect these locations.

The VDCR dataset identified one Conservation Site and three SCUs in the Project study area. Conservation Sites and SCUs are given a biodiversity significance ranking of 1 to 5 based on rarity, quality, and number of natural heritage resources they contain. The Silver Lake Conservation Site, Bull Run – Chestnut Lick SCU, and Cartharpin Creek above Rt 676 SCU are ranked B2 (Very High) priority. Broad Run SCU is ranked B3 (High) priority.

The Silver Lake Conservation Site is located in Prince William County and contains the Piedmont/Northern Coastal Plain Basic Seepage Swamp, a VDCR natural heritage resource of concern. The VDCR's NHR Program ranks this area as a B-2 Very High priority conservation site. The site is located approximately 0.5 mile downstream of the New Road Alternative crossing of Little Bull Run. This upstream crossing is likely capable of being spanned without affecting Little Bull Run or the Silver Lake Conservation Site.

The Bull Run – Chestnut Lick SCU is a branching stream located in Prince William County and according to VDCR data, provides rare habitat for aquatic communities. The VDCR's NHR Program ranks this area as a B-2 Very High priority conservation site. The New Road Alternative crosses the Bull Run – Chestnut Lick SCU multiple times along an existing 115 kV transmission line, as discussed above. These crossings are likely capable of being spanned without affecting the Bull Run – Chestnut Lick SCU.

The Catharpin Creek above Route 676 SCU is located in Prince William County and according to VDCR data, also provides rare habitat for aquatic communities. The VDCR's NHR Program ranks this area as a B-2 Very High priority conservation site. This SCU begins approximately 3.0 miles downstream of the New Road Alternative Route crossing of Catharpin Creek. This upstream crossing is likely capable of being spanned without affecting the Catharpin Creek above Route 676 SCU.

The Broad Run SCU is located in Prince William County and according to VDCR data, also provides rare habitat for aquatic communities. The VDCR's NHR Program ranks this area as a B3 - High priority conservation site. The Broad Run SCU begins approximately 1.8 miles east-northeast of the Wheeler Alternative Route terminus, and is not crossed by any of the alternative routes; however, the Wheeler Alternative Route crosses Lake Manassas, which feeds the SCU.

The VDCR data did not identify any General Location Areas that are crossed by the potential routes.

3.2.5 Protected Species

NRG obtained data from the VDCR's Natural Heritage Data Explorer, VDGIF Fish and Wildlife Information Service, and the FWS Information, Planning, and Conservation System (IPaC) to identify locations within the study area that potentially support federally and state-protected species.

Digital data was obtained from the VDCR and from the VDGIF to identify locations within the study area that potentially support protected species. NRG also conducted county queries of the VDCR's NHR Program website, the VDGIF Virginia Fish and Wildlife Information Service website, and reviewed threatened and endangered species lists maintained by the FWS for each county. Species occurrences reported by the federal and state species lists were evaluated against the VDGIF's digital listed species observations (SppObs) data, and the VDCR's element occurrence representations (EOREps) datasets. A summary of the findings is provided in Sections 3.2.5.1 and 3.2.5.3 below.

The VDCR's EOREps are mapped representations of plants, animals, and exemplary natural communities, which are tracked by the VDCR's NHR Program due to their rarity. Each occurrence is represented by a polygon indicating its known location. The polygons are intended to indicate the full known aerial extent of the occurrence, modified to account for the locational uncertainty of the source data. The VDGIF's SppObs dataset includes all verified species documentations maintained by VDGIF. The EOREps and SppObs datasets documented no occurrences of plants, animals, or exemplary natural communities crossed by the Projects' routes. The VDCR EOREps and the VDGIF SppObs datasets indicate the brook floater (*Alasmodonta varicosa*) and yellow lance mussel (*Elliptio lanceolata*), have been documented in the Broad Run SCU, which begins approximately 1.8 miles northeast of the Wheeler Alternative Route terminus. The brook floater is a state-listed endangered species and is described in Table 3.2.4-1, below. The yellow lance is a federally-listed Species of Concern and is described in Table 3.2.5-1, below. Although nearby, the Wheeler Alternative Route would not impact the Broad Run SCU, brook floater, or the yellow lance mussel, due to the distance of the alternative route to the stream.

Additional VDGIF data were reviewed to identify potential listed species habitat within the Project vicinity including Threatened and Endangered Species Waters (TEWaters),

Anadromous Fish use Areas, and colonial waterbird datasets. The VDGIF TEWaters dataset includes the location of waters in which a listed species has been documented and which agency biologists have determined are currently occupied by such species. According to VDGIF data, the study area contains one TEWaters location. This location is analogous to the Broad Run SCU and has been documented to support the brook floater, as described above. The VDGIF data did not identify any colonial waterbird colonies or anadromous fish use areas in proximity to the Project routes.

3.2.5.1 Federally- and State-Listed Endangered and Threatened Species

Species occurrences reported by the FWS Virginia Field Office and the VDCR NHR Program county lists were evaluated against the VDGIF's SppObs data, and the VDCR's EOREps datasets, which display species occurrences at the local level. A summary of the federally- and state-listed species documented within Loudoun, Fauquier, and Prince William Counties is presented in Table 3.2.5-1. Federal Species of Concern are summarized in Section 3.2.5.3 of this document.

The data review identified three federally-listed species protected under the Federal Endangered Species Act (ESA) and the Virginia ESA, including the northern long-eared bat (*Myotis septentrionalis*), dwarf wedgemussel (*Alasmidonta heterodon*), and harperella (*Ptilimnium nodosum*). The dwarf wedgemussel has been documented in Fauquier County, and the harperella has been documented in Prince William County. The northern long-eared bat is likely within Fauquier, Loudoun, and Prince William Counties.

The data review also identified one state-only listed species protected under the Virginia ESA, the brook floater, which has been documented in Fauquier County.

The EOREps and SppObs datasets documented no federal- or state-listed species occurrences within the project's routes. The VDGIF TEWaters dataset indicates the brook floater mussel has been documented in the Broad Run SCU, however this SCU is 1.8 miles from the nearest route alternative.

3.2.5.2 Bald Eagle Management

The bald eagle is no longer listed under the federal ESA, but is a state-listed threatened species in Virginia under the Virginia ESA and protected under Va. Code § 29.1-521 and VDGIF regulations (4 VAC 15-30-10). The bald eagle is also protected under the federal Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. The Bald Eagle Protection Guidelines for Virginia (FWS and VDGIF, 2000) provide management practices for avoiding take of bald eagles and outline restrictions on construction activities within defined management zones. Proposed activities that have the potential to affect bald eagles are evaluated by the VDGIF on a case-by-case basis.

To obtain the most current eagle nest data, NRG reviewed the Center for Conservation Biology (CCB) "VAEagles" website (Watts and Byrd, 2013), which provides information about the Virginia bald eagle population including the results of the CCB's annual eagle nest survey. Based on the CCB's 2013 survey, the Project does not intersect the Primary or Secondary Management Zones of any documented eagle nest locations. The nearest documented eagle nest is located approximately 1.8 miles northeast of the Wheeler Alternative Route. According to the FWS Virginia Field Office's Bald Eagle Map Tool, the Project does not intersect any designated bald eagle concentration areas (FWS, 2013).

TABLE 3.2.5-1

Haymarket Substation and 230 kV Transmission Line Project
Federal- and State-Listed Species Occurrence in the Vicinity of the Proposed Project

Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	County/City Documented	Route Section Occurrence
FEDERALLY-LISTED SPECIES							
Mammals							
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	None	G4	Generally associated with old-growth or late successional interior forests. Partially dead or decaying trees are used for breeding, summer day roosting, and foraging. Hibernation occurs primarily in caves, mines, and tunnels.	Fauquier, Loudoun, and Prince William County	None
Mussels							
Dwarf wedgemussel	<i>Alasmodonta heterodon</i>	LE	LE	G1, G2	Deep quick running water on cobble, fine gravel, or on firm silt or sandy bottoms.	Fauquier County	None
Plants							
Harperella	<i>Ptilimnium nodosum</i>	LE	None	G2	Occurs in three habitat types: rocky/gravelly shoals or cracks in bedrock outcrops beneath the water surface in clear, swift-flowing streams (Usually in microsites that are sheltered from rapidly moving water); edges of intermittent pineland ponds or low, wet savannah meadows on the Coastal Plain; and granite outcrop seeps.	Prince William County	None
STATE-LISTED SPECIES							
Mussels							
Brook floater	<i>Alasmodonta varicosa</i>	None	LE	G3	Creeks and small rivers, found among rocks in gravel substrates and in sandy shoals, flowing-water habitats only.	Prince William County	None
Federal/State Status:							
LE: Listed as endangered.							
LT: Listed as threatened.							
Global Rank:							
G1: Critically Imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors.							
G2: Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.							
G3: Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.							
G4: Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.							
G5: Secure: Common; widespread, and abundant.							

3.2.5.3 Species of Concern and Other Documented Occurrences

NatureServe, an international network of Natural Heritage Programs, assigns a Global Rank based on rarity and conservation status. Species ranked "G1" (global rank 1/critically imperiled) or "G2" (global rank 2/imperiled) are most at risk. Forest certification systems, such as the Sustainable Forestry Initiative, protect all "G1" and "G2" species and natural communities, even if they are not listed and protected under the ESA. According to the federal and state datasets reviewed, no "G1" or "G2" species have been documented within the Project corridor.

A summary of the federally-listed Species of Concern occurring in the Project's counties is included in Table 3.2.5-2. Species of Concern typically are not afforded the same level of protection as federally- and state-listed endangered and threatened species. The EOREps and SppObs datasets documented no federal or state Species of Concern occurrences within the Project's routes.

The VDCR also indicated that the mottled duskywing (*Erynnis martialis*), a butterfly assigned a Global Rank of "G3", has been historically documented in the project vicinity. The mottled duskywing favors open woods, barrens, sand hills, and brushy fields. Its host plant, New Jersey Tea (*Ceanothus americanus*), could be found along portions of the New Road Alternative and Wheeler Alternative Routes.

TABLE 3.2.5-2 Haymarket Substation and 230 kV Transmission Line Project Species of Concern in Vicinity of Proposed Project							
Common Name	Scientific Name	Federal Status	State Status	Global Rank	Habitat	County/City Documented	Route Section Occurrence
Mussels							
Yellow lance	<i>Elliptio lanceolata</i>	Species of Concern	None	G2, G3	Sandy substrates, rocks and in mud, in slack water areas, but apparently is absent from lakes.	Fauquier, Prince William	None
Global Rank:							
G1:	Critically Imperiled: At very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors.						
G2:	Imperiled: At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.						
G3:	Vulnerable: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.						

3.2.6 Vegetation

The vegetation of the Northern Piedmont has been severely altered by clearing as part of ongoing agricultural and silvicultural practices occurring since European settlement. Prior to the effects of European settlement, the vegetation was influenced by the practices of Native Americans. Writings from early explorers indicate that parts of the Piedmont were once open, savanna-like woodlands and grasslands. Native Americans' practices included burning the forests to drive game and keep the understory of forests clear for hunting. More recently, forests in this area have undergone a cycle of clearing, farming, and regenerating. The fallow farmlands, if left unattended, undergo a successional regeneration process that generally results in a prevalence of early successional trees such as Virginia pine (*Pinus virginiana*) and

tulip-poplar (*Liriodendron tulipifera*), which ultimately matures into oak-hickory forest (Flemming, 2004).

The effects of man's influence on the landscape for centuries has resulted in a patchwork of secondary forests, pastures, and agricultural fields. The vegetation of the remaining forests occurring throughout the project area is now a predominant mix of pine (*Pinus* sp.) and hardwoods, likely including hickories (*Carya* sp.) and oaks (*Quercus* sp.). NRG reviewed publicly-available Forest Conservation Model data prepared by the VDOF to assess the value of forest resources crossed by the project (Figure 14 in Appendix C). Further descriptions of the habitats and VDOF priority areas crossed by the different options are provided below.

Carver Road Alternative Route (Gainesville-Haymarket)

The Carver Road Alternative Route is 6.7 miles in length and would require the clearing of a new right-of-way 100 feet wide to install new structures for the overhead transmission line. One short segment of the alternative would have an 80-foot right-of-way instead of 100-foot. The route is a mixture of industrial, residential and forested land. The alternative crosses one small (approximately 50 feet) stretch of high priority forest near the North Fork of Broad Run. The alternative crosses approximately 2.1 miles of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way.

I-66 Hybrid Alternative Route (Gainesville-Haymarket)

The I-66 Hybrid Alternative Route is 5.3 miles in length. The alternative would require the clearing of a new 100-foot-wide, 2.2-mile right-of-way to install new structures for the overhead transmission line, and the clearing of a new 50-foot-wide, 3.1-mile right-of-way to install the underground portion of the route. The route is a mixture of industrial, residential, and forested land. The alternative does not cross any high priority forest and crosses 0.5 mile of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in the forested land.

I-66 Overhead Alternative Route (Gainesville-Haymarket)

The I-66 Hybrid Alternative Route is 5.0 miles in length. The alternative would require the clearing of a new 100-foot-wide right-of-way to install new structures for the overhead transmission line. The route is a mixture of industrial, residential, and forested land. The alternative does not cross any high priority forest and crosses 0.4 mile of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in the forested land.

Madison Alternative Route (Gainesville-Haymarket)

The Madison Alternative Route is 8.2 miles in length and will require the clearing of a new 100-foot-wide right-of-way to install new structures for the overhead transmission line. The route is a mixture of industrial, residential, and forested land. The alternative crosses one small (about 50 feet) area of high priority forest. The alternative crosses 2.8 miles of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in the forested land.

New Road Alternative Route (New Road-Haymarket-Wheeler)

The New Road Alternative Route is 21.2 miles in length and will generally require the clearing of a new 100-foot-wide right of way to install new structures for the overhead transmission line. The route is a mixture of agricultural, forested, and residential land. The alternative crosses 2.2 miles of high priority forest scattered along the route. The alternative also crosses 4.9 miles of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in the forested land.

Northern Alternative Route (Gainesville-Haymarket)

The Northern Alternative Route is 6.1 miles in length and will require the clearing of a new 100-foot-wide right-of-way to install new structures for the overhead transmission line. The route is a mixture of industrial, residential, and forested land. The route crosses one small (about 160 feet) area of high priority forest on the north side of I-66 before crossing the interstate and heading into the proposed substation location. The route crosses 2.1 miles of medium priority forest including the crossing of Conway-Robinson Memorial State Forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way.

Railroad Alternative Route (Gainesville-Haymarket)

The Railroad Alternative Route is 5.7 miles in length and will require the clearing of both a new 100- and 120-foot-wide right-of-way to install new structures for the overhead transmission line. The route is a mixture of industrial, residential, and forested land. This alternative crosses multiple areas of high priority forest located along North Fork of Broad Run totaling about 0.1 mile. The alternative also crosses about 1.8 miles of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in the forested land.

Wheeler Alternative Route (Wheeler-Haymarket)

The Wheeler Alternative Route is 8.6 miles in length and will generally require the clearing of a new 100-foot-wide right of way to install new structures for the overhead transmission line. The route is a mixture of agricultural, forested, and residential land. The alternative crosses 0.7 mile of high priority forest scattered along the route. The alternative also crosses 1.9 miles of medium priority forest. The alternative would alter the character of the existing vegetation through the clearing for a new right-of-way in forested land.

3.3 Visual Constraints

NRG identified visually sensitive areas through review of recent (2013) digital aerial photography. These were defined as areas of an undeveloped or rural character; places where an electric transmission line would be out of character with the surrounding visual characteristics of the landscape; or individual sites possessing unique scenic qualities or viewsheds. Examples of visually sensitive areas include residential or recreational areas; historic, traditional, or rural landscapes or districts; open space; natural features; and individual sites such as historic sites or buildings.

One state designated scenic byway and one state scenic road are located in the Project area. James Madison Highway (U.S. 15) runs north/south and is crossed by all of the route

alternatives. John Marshall Highway (SR 55) cuts through the center of the Town of Haymarket heading east until it ends at the connection with Lee Highway (U.S. 29). The entire portion of the highway within the Project area has been designated Virginia State Scenic Road.

One recreational trail is located in the project area. The Culpeper Loop of the Virginia Birding and Wildlife Trail generally runs north/south and is crossed by all of the route alternatives. This trail is driving route between the town of Culpeper that follows James Madison Highway/Lee Highway (U.S. 15/U.S. 29) and Broad Run along I-66.

One National Heritage Area (NHA) extending between Gettysburg, Pennsylvania and Charlottesville, Virginia is about 180 miles long and 75 miles wide. The Journey Through Hallowed Ground NHA includes sites that illustrate Revolutionary War, Civil War, and presidential history. All Project routes fall within the NHA and several scenic, natural, recreational, and historic places are featured within the NHA near James Madison Highway (U.S. 15) and SR 20.

Carver Road Alternative Route (Gainesville-Haymarket)

The Carver Road Alternative Route consists of primarily of industrial/commercial, forested, and lower density residential areas. From the tie-in location near Cushing Road (SR 781), the Carver Road Alternative Route is comprised of industrial and forested areas, following the north side of I-66 and portions of Lee Highway (U.S. 29). The area between Lee Highway (U.S. 29) and James Madison Highway (U.S. 15) is comprised of a mix of low density residential areas interspersed with small forested areas. West of James Madison Highway (U.S. 15), the route crosses industrial land before reaching the proposed Haymarket Substation. With the exception of small forested areas, the views along the transmission line are represented by open, but industrial uses and residential development.

The potentially visually sensitive features that are crossed by the transmission line are four battlefields, including the Thoroughfare Gap Battlefield, Buckland Mills Battlefield, Manassas Station Operations, and the Second Battle of Manassas. A portion of the Thoroughfare Gap Battlefield is listed in the National Register of Historic Places (NRHP); the Buckland Mills Battlefield and Manassas Station Operations Battlefield are NRHP-eligible; and the Second Battle of Manassas is unevaluated as designated by the American Battlefield Protection Program (ABPP).

I-66 Hybrid Alternative Route (Gainesville-Haymarket)

The I-66 Hybrid Alternative Route is a mixture of industrial, commercial, residential, and forested land. From the tie-in location near Cushing Road (SR 781), the route follows the same path as the Carver Road Alternative Route until the second crossing of I-66. On the south side of I-66, the I-66 Hybrid Alternative Route crosses agricultural and commercial land. An overhead to underground transition occurs south of I-66 just west of Lee Highway (U.S. 29). The transmission line joins the same alignment as the I-66 Overhead Alternative Route near the proposed Haymarket Substation.

With the exception of small forested areas, the views along the transmission line are represented by residential development along major roads and mixed industrial and commercial development. The potentially visually sensitive features that are crossed by the I-66 Hybrid Alternative are the same battlefields as the Carver Road Alternative Route.

I-66 Overhead Alternative Route (Gainesville-Haymarket)

The I-66 Overhead Alternative Route is a mixture of industrial, residential, and forested land. Almost half of the lands crossed by the I-66 Overhead Alternative Route are road rights-of-way. From the tie-in location near Cushing Road (SR 781), the route follows the same path as the Carver Road Alternative Route until it crosses an off ramp to I-66. At this point the Carver Road Alternative Route heads south crossing I-66 and the I-66 Overhead Alternative Route continues on the north side of I-66. Residential development is concentrated along I-66 between Lee Highway (U.S. 29) and James Madison Highway (U.S. 15). The transmission line joins the same alignment as the I-66 Hybrid Alternative Route near the proposed Haymarket Substation.

With the exception of small forested areas, the views along the transmission line are represented by residential development along major roads and mixed industrial and commercial development. The potentially visually sensitive features that are crossed by the I-66 Overhead Alternative Route are the same battlefields as the Carver Road Alternative Route.

Madison Alternative Route (Gainesville-Haymarket)

The Madison Alternative Route is a mixture of industrial, commercial, low density residential, and forested land. About half of the Madison Alternative Route is collocated with road or railroad rights-of-way. From the tie-in location near the end of Cushing Road (SR 781), the route follows the same path as the Carver Road Alternative Route until a point on the south side of Carver Road before crossing Old Carolina Road. From here the route breaks from the Carver Road Alternative Route continuing generally westward towards James Madison Highway (U.S. 15). The route is collocated with the highway until reaching the Norfolk Southern Railroad where it heads west along the railroad and terminates at the proposed Haymarket Substation.

The western half of the Madison Alternative Route is more rural and crosses greater amounts of forested areas with more restricted views than the more open residential, industrial, and commercial areas crossed by the eastern portion of the route. The potentially visually sensitive features that are crossed by the transmission line are the same battlefields as the Carver Road Alternative Route.

New Road Alternative Route (New Road-Haymarket-Wheeler)

The New Road Alternative Route consists of agricultural and forest lands. From the tie-in location at the New Road Substation, the route would head southwesterly toward I-66. The route crosses the county-designated rural area known as the Rural Crescent, which is comprised of a mixture of agricultural and forested land. North of I-66, in addition to crossing the Rural Crescent, much of the route is collocated with electric and road rights-of-way. South of I-66, the route would reach the Norfolk Southern Railroad before heading eastward where it terminates at the proposed Haymarket Substation.

The potentially visually sensitive features crossed by the New Road Alternative Route include the Rural Crescent and three battlefields: Manassas Station Operations Battlefield; Buckland Mills Battlefield; and Thoroughfare Gap Battlefield. Additionally, several NRHP-eligible and potential historic properties occur within 0.5 mile of the New Road Alternative Route, including the Southern Railway Depot at Thoroughfare, the Thoroughfare Historic District, the Spencer-Vermillion House, and the Henry T. George Farm.

The second portion of the New Road Alternative Route is a mixture of forest, residential, agricultural, and industrial land. East from the Wheeler Station proposed in Case No. PUE-2014-00025, the route crosses primarily forested and agricultural land, but is collocated with electric transmission right-of-way to its terminus near Dam Junction. West from the proposed Wheeler Station, the route crosses forested primarily forested and agricultural land. At SR 600, the route heads north and just north of Lee Highway (U.S. 15), the alternative crosses the Rural Crescent. South of John Marshall Highway (SR 55), the route heads east and ends at the proposed Haymarket Substation.

This area is rural with agricultural areas separated by tracts of forested land. The potentially visually sensitive features crossed by the Wheeler Alternative include the Rural Crescent and three battlefields: Manassas Station Operations Battlefield; Buckland Mills Battlefield; and Thoroughfare Gap Battlefield. Additionally, several NRHP-eligible historic properties occur within 0.5 mile of the alternative, including the Southern Railway Depot at Thoroughfare and the Thoroughfare Historic District.

Northern Alternative Route (Gainesville-Haymarket)

The Northern Alternative Route is a mixture of forested, developed, recreational, conservation, and agricultural land. From the tie-in location near the end of Cushing Road (SR 781), the Northern Alternative Route crosses I-66 and is collocated with the interstate highway to Lee Highway (U.S. 29) where it crosses recreational lands along the western edge of Conway-Robinson Memorial State Forest. Between the state forest and James Madison Highway (U.S. 15), two additional recreational areas are crossed, the Heritage Hunt Golf and Country Club and the Piedmont Club, near a residential area. The route generally follows highways until it terminates at the proposed Haymarket Substation.

With the exception of the state forest, this area contains open views of residential, recreational, and agricultural areas. The features that may be visually sensitive and that are crossed by the Northern Alternative Route, include the same battlefields as the Carver Road Alternative Route as well as the Conway-Robinson Memorial State Forest, the Heritage Hunt Golf and Country Club, and the Piedmont Club.

Railroad Alternative Route (Gainesville-Haymarket)

The Railroad Alternative Route is a mixture of industrial, residential, and forested land. From the tie-in location near the end of Cushing Road (SR 781), the route follows the Carver Road Alternative Route to just southwest of the Norfolk Southern Railroad crossing where it then follows the southern side of the Norfolk Southern Railroad. The route then meets up with the Carver Road Alternative Route and follows it into the proposed Haymarket Substation. More than half of this route is collocated with the railroad or roads.

This area contains open views and is generally developed. The potentially visually sensitive features crossed by Railroad Alternative Route, include the same battlefields as the Carver Road Alternative Route.

Wheeler Alternative Route (Wheeler-Haymarket)

The Wheeler Alternative Route is a mixture of forest, residential, agricultural, and industrial land and is the same as the second portion of the New Road Alternative Route as described above.

3.4 Cultural Resources Constraints

NRG retained Dutton & Associates, LLC (D+A) to conduct a cultural resources literature review and Pre-Application Analysis for the Project. The review area included a 1.5-mile buffer of each route alternative for historic and architectural resources and for archaeological sites. To satisfy the Virginia Department of Historic Resources (VDHR) *Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia* (2008) (*Guidelines*), D+A's review considered National Historic Landmark (NHL) properties located within a 1.5-mile radius of each project component; NHLs, NRHP-listed properties, battlefields, and historic landscapes within a 1.0-mile radius of each of Project component; NHLs, NRHP-eligible and -listed properties, battlefields, and historic landscapes within a 0.5-mile radius of each project component; and architectural resources and archaeological sites located within the right-of-way of each project component.

D+A examined site files maintained by the VDHR, Prince William County Planning Commission, and the National Park Service (NPS) to identify previously recorded archaeological, historical, and architectural sites within the 1.5-mile review area, including sites listed in or eligible for listing in the NRHP. A review of the NPS ABPP maps and related documentation was also conducted.

D+A conducted field assessments of known NRHP-eligible or -listed architectural resources within 1.5 miles of each of the project components in accordance with the VDHR *Guidelines*. Digital photographs of each architectural resource and surrounding setting were recorded, where visible from a public right-of-way, to accurately represent the viewshed of the site. Additionally, D+A documented five balloon flights at publically accessible locations to assess possible viewshed impacts for the route alternatives.

A copy of D+A's report, which presents the results of the literature review and field assessment for the each of the Project components is provided in Appendix B.

Limited areas of the Project area have been subjected to survey for battlefield assessment by the ABPP of the NPS, historic and architectural resources, or archaeological resources. Under the authority of the ABPP Act of 1996, the U.S. Department of the Interior is directed to provide updates to the Civil War Sites Advisory Commission (CWSAC) on the status of nationally-significant Civil War battlefields. In Virginia, the ABPP conducted a field assessment of several battlefields to identify the battlefield *study area* which represents the historic extent of the battle as it unfolded upon the landscape; the battlefield *core area* which represents the areas of fighting on the battlefield and typically includes the areas of greatest importance to understanding the events of the battle; the *potential National Register* boundaries which encompass the area that remains reasonably intact and warrants preservation; and NRHP-listed boundaries. Additionally, the ABPP assessed the overall condition of each battlefield's study area. The results of this study were presented to the CWSAC in 2009. The study areas of four battlefields are crossed by one or more of the alternative routes or are located within the tiered study areas; Buckland Mills Battlefield and Manassas Station Operations (Bristoe Station Battlefield/Kettle Run Battlefield) are eligible for listing in the NRHP; and Thoroughfare Gap Battlefield and the Second Battle of Manassas (Manassas II/Brawner's Farm) have not been evaluated for listing in the NRHP. While Thoroughfare Gap Battlefield as a whole has not been formally evaluated for the NRHP, a small portion of the battlefield near the intersection of Beverly Mill Road and John Marshall Highway (SR 55) is listed in the NRHP and Virginia Landmarks Register (VLR), and is a Prince William County Registered Historic Site.

The Consolidated Natural Resources Act of 2008 (Public Law 110-229) established the Journey Through Hallowed Ground NHA. The NPS (2015) defines NHAs as congressionally-designated places where natural and cultural resources form a cohesive landscape of national importance. The Journey Through Hallowed Ground NHA is about 180 miles long and follows the route of the Old Carolina Road from Gettysburg, Pennsylvania to Charlottesville, Virginia, and also crosses portions of West Virginia and Maryland (Journey Through Hallowed Ground [JTHG] Partnership, 2014). This NHA contains sites that illustrate Revolutionary War, Civil War, and presidential history. In Virginia, the Journey Through Hallowed Ground NHA crosses about 75 miles and nine counties, including Prince William, Fauquier, and Loudoun Counties. Several scenic, natural, recreational, and historic places are featured within the NHA near U.S. 15 and SR 20. The project review area includes military landscapes, cultural resources, and historic properties that fall within the NHA; these resources are listed in Table 3.4-1.

TABLE 3.4.1		
Haymarket Substation and 230 kV Transmission Line Project		
Historic and Architectural Resources within the Journey Through Hallowed Ground National Heritage Area		
Site Number	Site Name	NRHP/PWC Status
030-5152	Buckland Mills Battlefield	Eligible
030-5610 (030-1016)	Thoroughfare Gap Battlefield	Unevaluated ^a
076-0015	Mount Atlas	Listed ^b ; CRHS ^c
076-0088	Locust Bottom (Rollingwood Farm)	Listed ^b ; CRHS ^c
076-0175	Greenwich Presbyterian Church	Listed ^b ; CRHS ^c
076-0178	The Lawn	Listed ^b ; CRHS ^c
076-0271	Manassas National Battlefield Park Historic District	Listed ^b ; CRHS ^c
076-0297	Conway Robinson Memorial State Forest	Not Eligible
076-0313	Buckland Historic District and Expansion	Listed ^b ; CRHS ^c
233-0002	St. Paul's Episcopal Church	Listed ^b
^a A portion of Thoroughfare Gap Battlefield is listed on the NRHP and VLR. This portion has been assigned a separate site number (030-1016) by the VDHR. ^b Resource listed on the NRHP and VLR. ^c Prince William County Registered Historic Site		

NRG obtained site information, digitized site locations, and previous survey information using data provided by D+A. A summary of the cultural resources considered by the VDHR is provided by resource category for each project component. In addition to D+A's research, NRG obtained data on prehistoric and historic sensitivity areas from the Prince William County Comprehensive Plan. These areas delineate locations known or believed to possess a heightened sensitivity for containing undocumented sites. Information on the cultural resources and sensitivity zones identified by Prince William County in the review areas are described by category below.

Archaeological site locations are considered confidential under the National Historic Preservation Act (NHPA); therefore, this study does not include a figure illustrating or depicting archaeological site locations. Unevaluated archaeological and architectural sites are treated by the VDHR as potentially eligible for listing in the NRHP

3.4.1 Archaeological Sites

D+A identified 427 previously recorded archaeological sites located in whole or part within the 1.5-mile review area. Of these, four sites are eligible for listing in the NRHP, two sites are potentially eligible for listing in the NRHP, 89 sites are not eligible for listing in the NRHP, and the remaining 332 sites are unevaluated. Of the 427 previously recorded archaeological sites, 20 are crossed by or within 20 feet of the right-of-way of one or more of the proposed route alternatives and are considered within the tiered study area defined by the VDHR *Guidelines*. These resources are discussed below.

Three previously recorded archaeological sites are located within the Carver Road Alternative Route right-of-way. Site 44PW1636 represents a historic domestic site and has been determined not eligible for listing in the NRHP; Site 44PW1853 represents an unevaluated historic trash scatter; and Site 44PW1854 is an unevaluated multicomponent site representing a historic trash scatter and a prehistoric camp site.

Two previously recorded archaeological sites (44PW0986 and 44PW1121) are located within the I-66 Hybrid Alternative Route right-of-way; both represent historic domestic sites. Site 44PW0986 is not eligible for listing in the NRHP, while Site 44PW1121 has not been evaluated for listing in the NRHP.

Three previously recorded archaeological sites (44PW0985, 44PW0986 and 44PW1121) are located within the I-66 Overhead Alternative Route right-of-way. Both 44PW0986 and 44PW1121 represent historic domestic sites, while 44PW0985 is a historic period quarry. Sites 44PW0985 and 44PW0986 are not eligible for listing in the NRHP, while Site 44PW1121 has not been evaluated for listing in the NRHP.

Two previously recorded historic archaeological sites (44PW1498 and 44PW1963) are located within the Madison Alternative Route right-of-way. Site 44PW1498 represents a twentieth century dwelling, while 44PW1963 represents an Antebellum period artifact scatter. Additionally, one historic site (44PW1852) is located within 10 feet of the Madison Alternative Route right-of-way. Site 44PW1852 represents a nineteenth century military camp site. None of the archaeological sites within or directly adjacent to the Madison Alternative right-of-way have been evaluated for listing in the NRHP.

Five previously recorded archaeological sites are located within the Northern Alternative Route right-of-way; none of which have been evaluated for listing in the NRHP. Site 44PW1839 is recorded as a single dwelling farmstead. The remaining four sites (44PW1936, 44PW1937, 44PW1945, and 44PW1944) date to the prehistoric period and are located within the Conway-Robinson Memorial State Forest. Additionally, a single unevaluated prehistoric site (44PW1932) is located within 5 feet of the Northern Alternative Route right-of-way within the Conway-Robinson Memorial State Forest.

Six previously recorded archaeological sites are located within the first portion of the New Road Alternative Route right-of-way. Four of the sites have not been evaluated for listing in the NRHP, while sites 44PW1948 and 44PW1727 are not eligible. Sites 44LD0350, 44LD0489, and 44PW0367 represent prehistoric sites; Sites 44PW1254 and 44PW1727 represent historic period dwellings; and Site 44PW1948 is recorded as a historic farmstead. Additionally, one